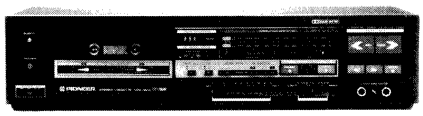
PIONEER

Service Manual



• CT 1160R [BK]

• CT-S55R [BK]

REPAIR & ADJUSTMENTS

ORDER NO.
ARP-786-0

STEREO CASSETTE TAPE DECK

CT-1160R
CT-1160R(BK)
CT-S55R
CT-S55R(BK)

- CT-S55R [BK] is the same as the CT-1160R [BK] except for the exterior design.
- CT-1160R [BK] is the black version of CT-1160R.
- CT-S55 [BK] is the black version of CT-S55R.
- As to the circuit and mechanism descriptions, please refer to the CT-1260R service manual (ARP-837-0).
- Models CT-1160R, CT-1160R !

Type	Applicable model				Power requirement	Destination
	CT-1160[BK]	CT-1160R	CT-S55R[BK]	CT-S55R		
KU	○	–	○	○	AC120V only	U.S.A.
KC	○	–	–	–	AC120V only	Canada
HEM	○	○	–	–	AC220V (240V)*	European continent
HB	○	○	–	–	AC240V (220V)*	United Kingdom
D	○	○	–	–	AC120V/220V/240V (switchable)	General market

*Change the primary wiring of the power transformer.

- This service manual is applicable to the KU, HEM, HB and D types.
- As to the HEM, HB and D types, please refer to pages 44 – 46.
- As to the KC type, please refer to the additional service manual (ARP-787-0).
- Ce manual d'instruction se refère au mode de réglage en français. (p. 33 – p. 37)
- Este manual de servicio trata del método ajuste escrito en español. (p. 38 – p.42)

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CONTENTS

1. SPECIFICATIONS 2
2. FRONT PANEL FACILITIES 3
3. DISASSEMBLY 5
4. PARTS LOCATION 8
5. ELECTRICAL PART LIST 10
6. P.C. BOARDS CONNECTION DIAGRAM 14
7. SCHEMATIC DIAGRAM 20
8. EXPLODED VIEW 21
9. PACKING 27
10. ADJUSTMENTS 28
RÉGLAGE 33
AJUSTE 38
11. SAFETY INFORMATION 43
12. SUPPLEMENT FOR CT-1160R/HEM, HB AND D TYPES 44

1. SPECIFICATIONS

Systems ..... 4 track, 2-channel stereo
Heads ..... "Hard Permalloy" recording/playback head x 1
"Ferrite" erasing head x 1
Motor ..... DC servo motor x 1
DC reel motor x 1
Wow and Flutter ..... No more than 0.08% (WRMS)
No more than ± 0.19% (DIN)
Fast winding Time ..... Approximately 90 seconds (C-60 tape)
Frequency Response
−20 dB recording:
Normal tape ..... 25 to 15 000 Hz
Chrom tape ..... 25 to 16 000 Hz
Metal tape ..... 25 to 17 000 Hz
0 dB recording:
Normal tape ..... 25 to 10 000 Hz
Chrome tape ..... 25 to 10 000 Hz
Metal tape ..... 25 to 15 000 Hz
Signal-to-Noise Ratio
Dolby NR OFF ..... More than 58 dB
Noise Reduction Effect
Dolby NR B type ON ..... More than 10 dB (at 5 kHz)
Dolby NR C type ON ..... More than 19 dB (at 5 kHz)
Harmonic Distortion ..... No more than 0.7%(0 dB)
Input (Sensitivity)
LINE (INPUT) ..... 70 mV (Input impedance 100 kΩ)
MIC (L,R) ..... 0.5 mV (Source impedance 600 Ω)
Output (Reference level)
LINE (OUTPUT) ..... 316 mV (Output impedance 4 kΩ)

Subfunctions

- Recording/Playback auto-reverse (Quick reverse)
- DOLBY NR B/C types
- 3 position tape selector (NORM/CrO_2/METAL)
- Timer stand-by function
- LED level meter
- Full automatic stop function
- One-touch recording stand-by function
- IC-based full logic control
- Oil damped eject function

Miscellaneous

Power Requirements
KU, KC models ..... AC 120 V, 60 Hz
HEM model ..... AC 220 V, 50/60 Hz
HB, HP models ..... AC 240 V, 50/60 Hz
D, D/G models ..... AC 120 V/220 V/240 V, 50/60 Hz (switchable)
Power Consumption
KU, KC models ..... 20 W
HEM, HB, HP models ..... 23 W
D, D/G models ..... 18 W
Dimensions ..... 420 (W) x 101 (H) x 211 (D) mm
16-9/16 (W) x 4 (H) x 8-5/16 (D) in
Weight (without package) ..... 3.8 kg (8 lb 6 oz)

Accessories

Operating instructions 1
Connection cord with pin plugs 2

NOTE:
Specifications and design subject to possible modifications without notice due to improvements.

QUESTIONNAIRE MODEL _____

One Model per questionnaire

Dear Servicer,

Thank you for your cooperation in the post-sale service of Pioneer products.

This questionnaire is used as a tool to improve the serviceability of our products and service manuals. Please evaluate this model and service manual by answering the following questions. Your ideas may be realized in our future products. Your answers will be appreciated. Thank you.

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

1. SERVICING EVALUATION	Circle applicable number:	Good		Fair		Poor
a. Disassembly/Re-assembly:		1	2	3	*4	*5
b. Circuit Checks:		1	2	3	*4	*5
c. Replacement of Parts:		1	2	3	*4	*5
d. Adjustment (s):		1	2	3	*4	*5

* If (4) or (5) was circled, please be specific.

e. Your advice, opinion or ideas related to servicing this product.

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

Please describe other areas of servicing which you may find difficult.

Completed by : Date :

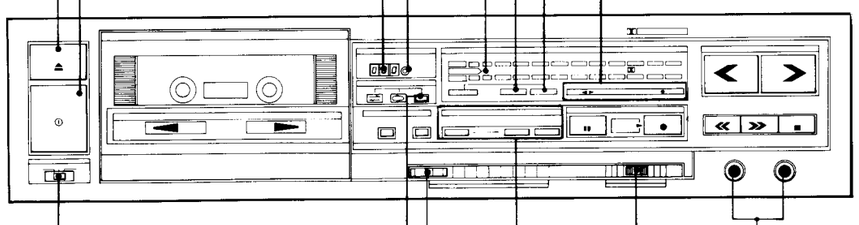
Company Name :

Address :

City/State/Zip :

Please send this form filled to the distributor in your country.

2. FRONT PANEL FACILITIES



Level meter

RESET button

Noise reduction indicators

TAPE COUNTER

Operating indicators

◄ ► : Lights during playback or recording mode.

● : Lights during recording mode.

POWER switch

EJECT button

MIC jacks

TIMER START switch

Used only when performing timer recording or playback. Normally, leave in the OFF position.

BALANCE control

This control is for adjusting the recording balance.

REVERSE MODE switch

This select the tape transport mode during playback or recording.

DOLBY NR switches

REC LEVEL control

TAPE SELECTOR switches

This selector allows the bias and equalizer characteristics to be selected during recording and equalizer characteristics during playback in line with the type of tape you are using.

Normal tape: Release the left switch (NORM).

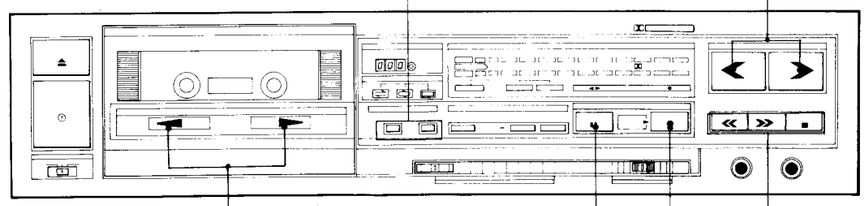
CrO_2 tape: Depress the left switch (HIGH) and release the right switch (CrO_2).

Metal tape: Depress both the right and left switches (HIGH, METAL).

PLAY MODE switches

◄ : Press to perform reverse recording or playback.

► : Press to perform forward recording or playback.



Direction indicators

- Indicates the direction of tape travel.
- Flashes during recording standby or playback pause modes.

RECORDING OPERATION switches

● : Recording switch. The deck cannot be placed in the recording mode if a cassette with broken erasure prevention tabs is loaded, or if no tape cassette is loaded.

■■ : Pause switch. Press to temporarily stop the tape travel. To restart the tape travel, press the reverse (◄) or forward (►) switch. The pause function does not operate when the deck is in the fast forward or rewind modes.

Operating switches

◄◄ : Rewind switch

►► : Fast forward switch

■ : Stop switch.

- Noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
- "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

3. DISASSEMBLY

3.1 TAPE TRANSPORT UNIT DISASSEMBLY

1. Remove the bonnet.

- Undo the two screws (left and right) securing the bonnet to the rear panel.

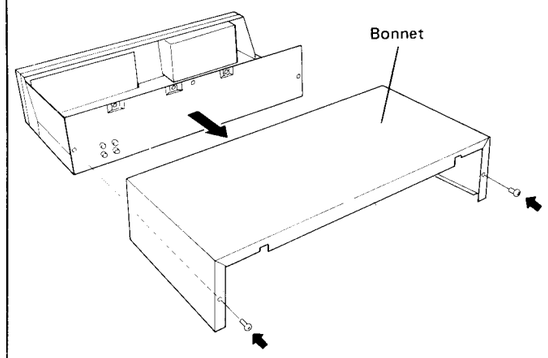


Fig. 3-1-1

2. Temporarily pass the counter belt around a chassis hook.

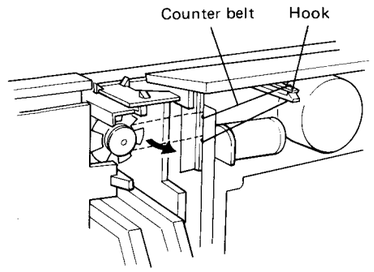


Fig. 3-1-2

3. Remove the tape transport unit.

- Undo the four screws securing the unit, and remove by lifting out diagonall towards the rear.

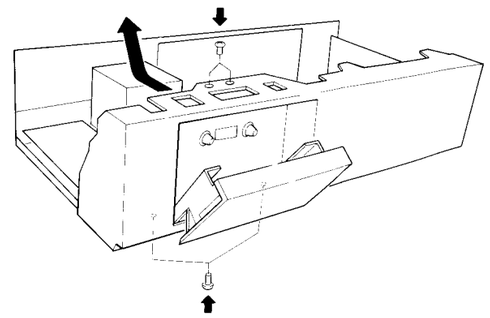


Fig. 3-1-3

3.2 FRONT PANEL REMOVAL

- Undo the screw along the bottom of the panel, and disengage the three upper and three lower hook catches.

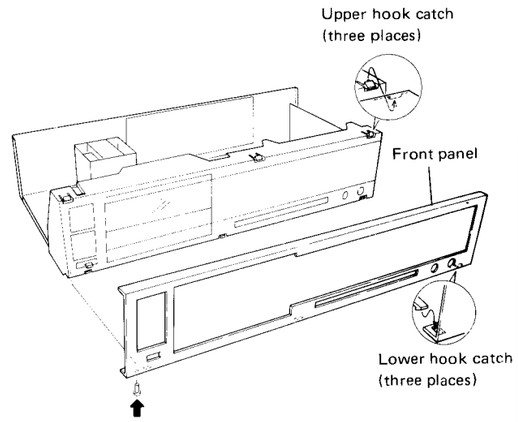


Fig. 3-2-1

3.3 COUNTER BELT REPLACEMENT

1. Remove the tape transport unit from the deck. (see page 5)

2. Remove the cassette plate.

- Undo the screw at the top right hand corner, and remove by lifting out diagonally towards the front.

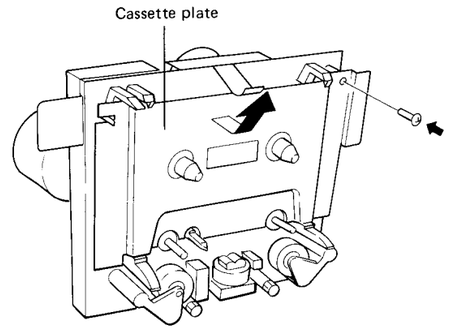


Fig. 3-3-1

3. Replace the belt, and reassemble in the reverse order.

3.4 CAPSTAN BELT REPLACEMENT

1. Remove the tape transport unit from the deck. (see page 5)

2. Loosen the cordfixers, and free the lead wires.

3. Remove the lead wire holder.

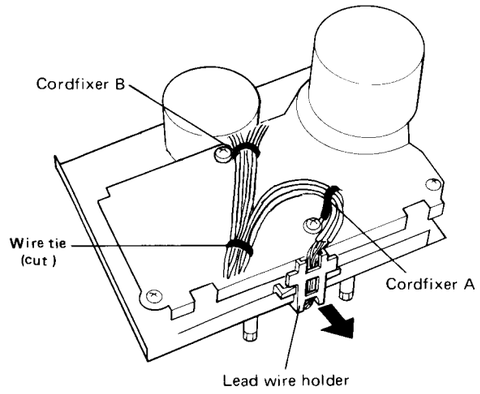


Fig. 3-4-1

4. Remove the motor bracket.

- Undo the three screws, and remove the motor bracket from the mechanism chassis.

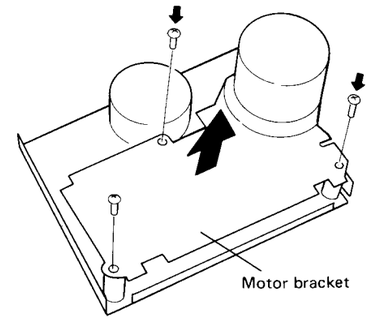


Fig. 3-4-2

5. Replace the belt, and reassemble in the reverse order.

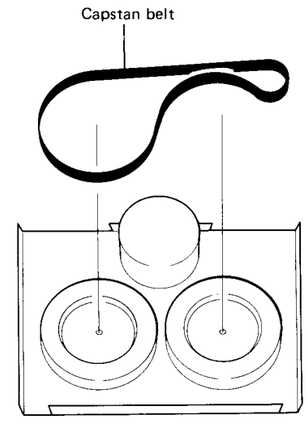


Fig. 3-4-3

3.5 CAPSTAN MOTOR REPLACEMENT

1. Remove the tape transport unit from the deck. (see page 5)
2. Disconnect the motor lead wires from the motor.

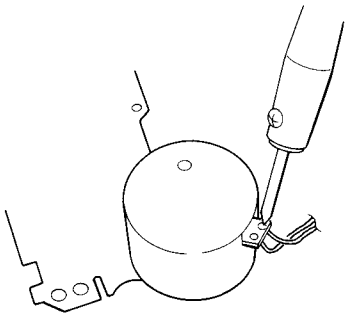


Fig. 3-5-1

3. Same as steps 2 thru 4 of the capstan belt replacement procedure described above. (see page 6)
4. Remove the capstan motor from the bracket, and replace it with a new motor.

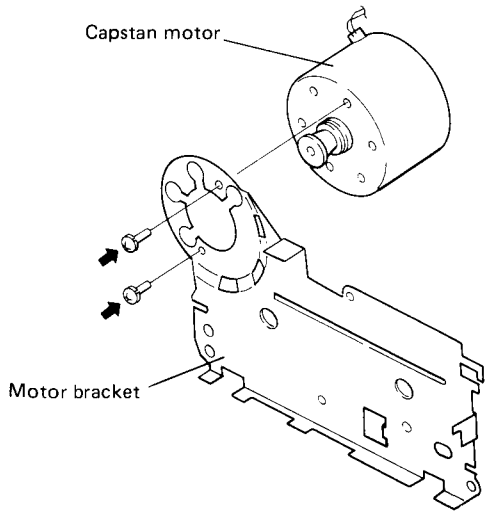


Fig. 3-5-2

5. Re-assembly in the reverse order (when mounting the motor, align the speed adjustment hole with the left hand side when viewed from behind).
6. Adjust tape speed.

3.6 TAPE HEAD REPLACMENT

1. Remove the tape transport unit from the deck. (see page 5)
2. Loosen the cordfixer A, and free the lead wires. (see Fig. 3-4-1)
3. Remove the lead wire holder. (see Fig. 3-4-1)
4. Undo the head securing screws, and pull out the head assembly.

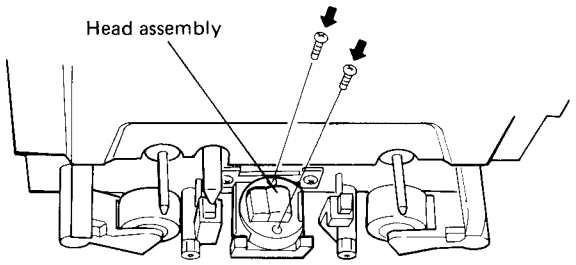


Fig. 3-6-1

5. Disconnect the lead wire soldering from the head with a soldering iron.

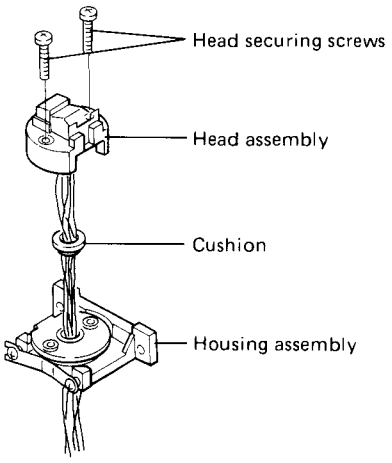


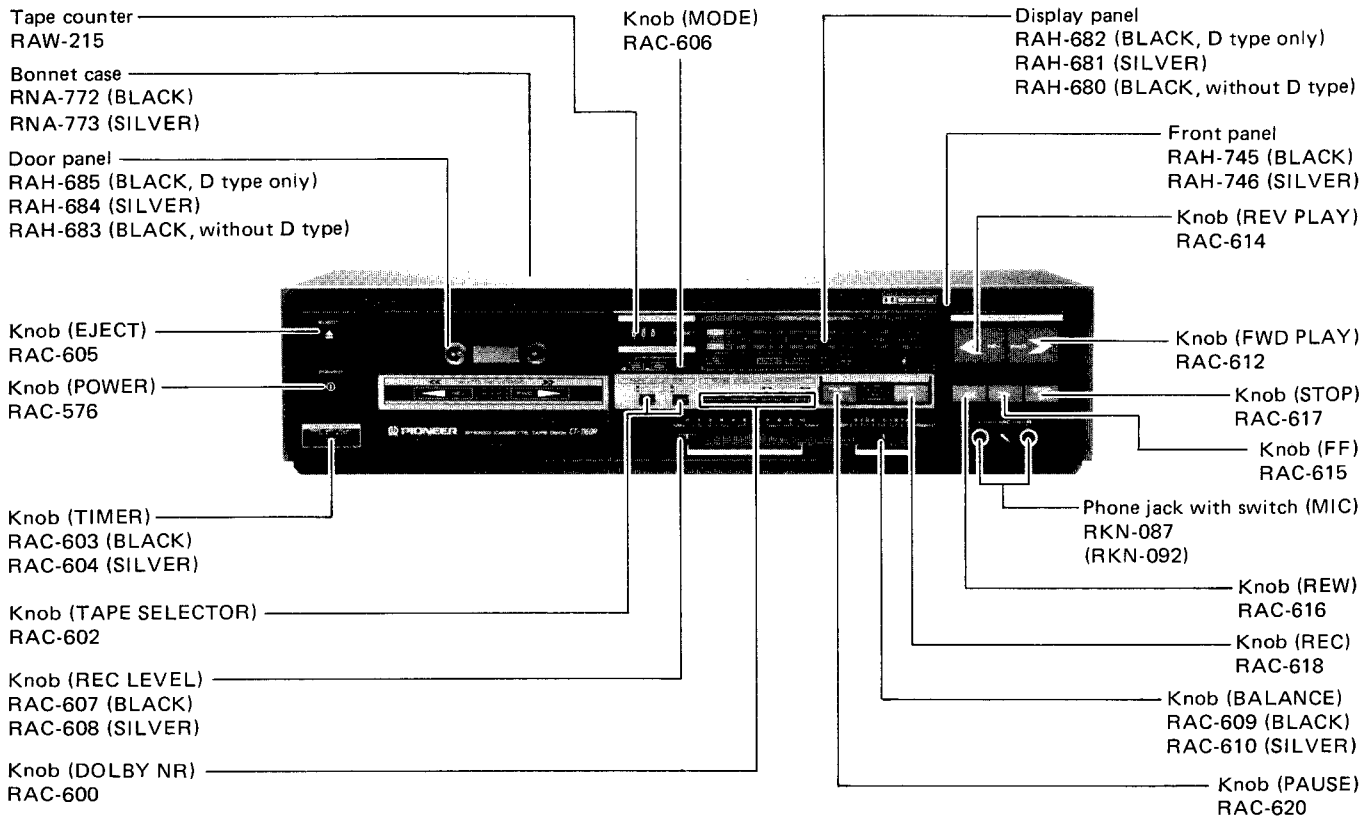
Fig. 3-6-2

6. Re-assembly in the reverse order.
7. Execute the "Tape transport adjustment" and "Electrical adjustments".

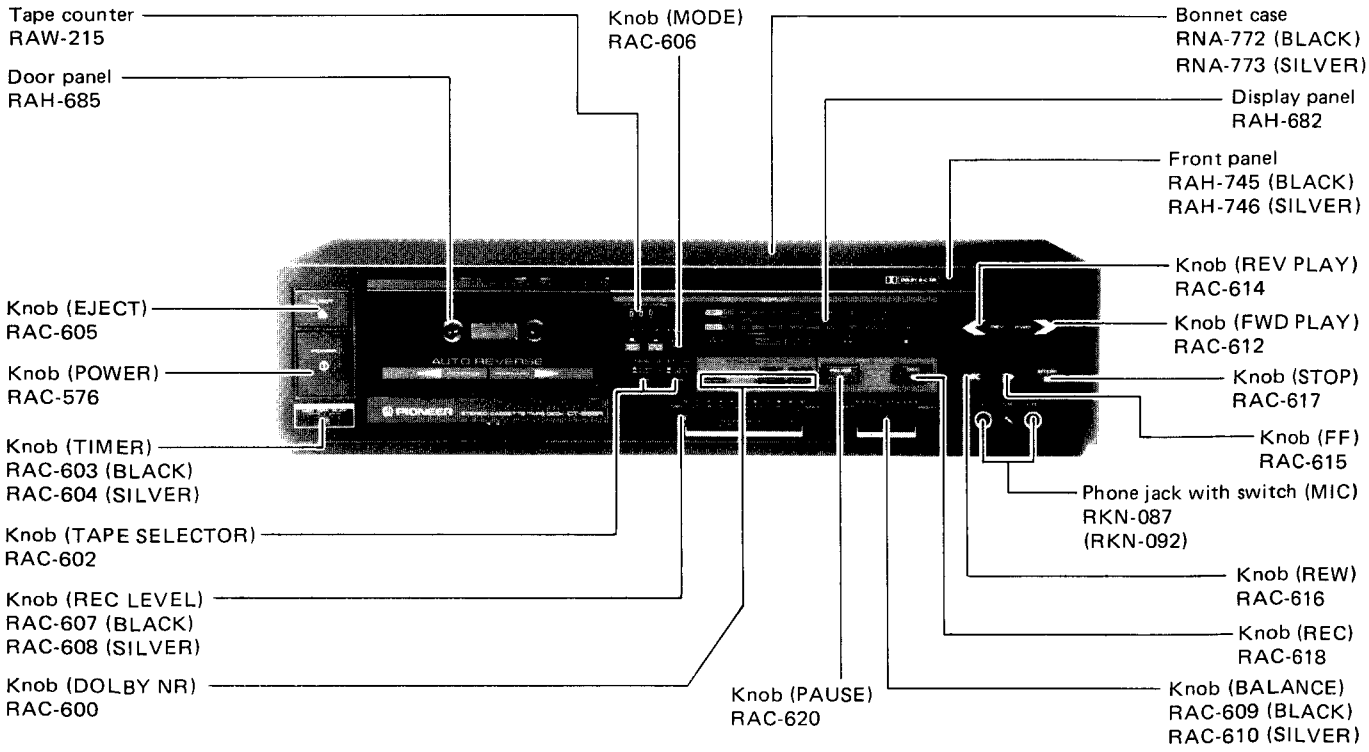
Note: After completing the head replacement procedure, always ensure that the securing screws are sealed.

4. PARTS LOCATION

Front Panel View (CT-1160R)

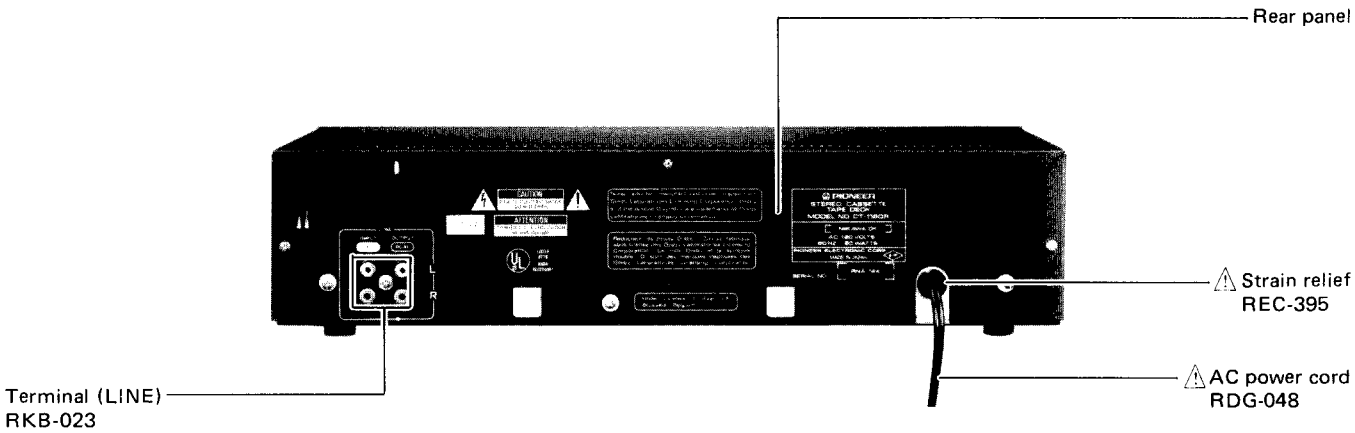


Front Panel View (CT-S55R)

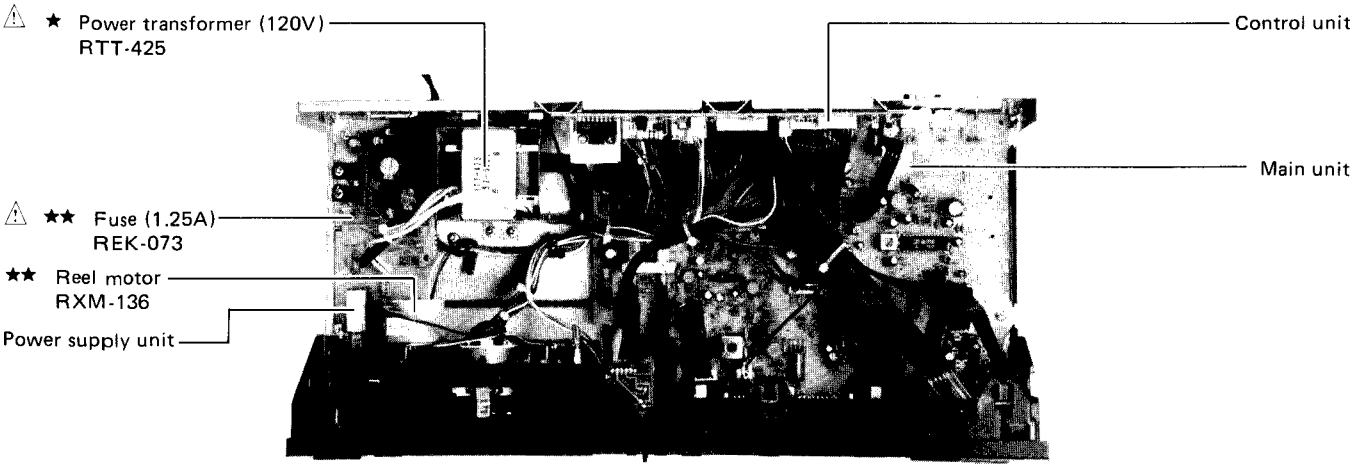


- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Rear Panel View (KU Type)



Top View (KU Type)



5. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number , temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD UNITS

Mark	Symbol & Description	Part No.
	Min unit	Non supply
	Power supply unit	
	Direction unit	
	Timer unit	
	Transistor A unit	
	Transistor B unit	
	Indicator unit	
	Control unit	
	End sensor unit	

OTHERS

Mark	Symbol & Description		Part No.
⚠ ★★	FU1	Fuse (1.25A)	REK-073
⚠ ★	T1	Power transformer (120V)	RTT-425
⚠	AC power cord		RDG-048
⚠	Strain relief (for AC power cord)		REC-395
★★	CM	Capstan motor	RXM-135
★★	RM	Reel motor	RXM-136
⚠ ★		Solenoid	RXP-161
★★		Tape head assembly	RPB-120
★		Leader tape sensor assembly	RXC-049
★★	S1	Push switch	RSG-179
★★	S2, S3	Push switch	RSG-178
★★	S4, S5	Spring switch	RSN-038

Main Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q105, Q205	AN7370K
★★	Q107	M5218L
★★	Q103	M5220L
★★	Q102, Q104, Q106, Q108 – Q110, Q202, Q204, Q206, Q208 – Q210, Q301, Q305, Q308	2SC1740SLN
★★	Q101, Q201	2SC2240
★★	Q302 – Q304	2SC3243
★★	Q307, Q309	2SA933SLN
★★	Q111, Q112, Q211, Q212	DTC143TS
★	D316, D317	1SS254
★	D304, D301, D313 – D315, D318, D319	1S2473
⚠ ★	D303	RD5.1FB1 (RD5.1FB2)
★	D305, D306	1SR35-100A
★	D302	MTZ5.6B (RD5.6EB2)

SWITCH

Mark	Symbol & Description		Part No.
★★	S301, S302	Push switch assembly A (TAPE SELECTOR)	RSG-170

COILS

Mark	Symbol & Description		Part No.
	L301	OSC coil	RTD-037
	L105, L205	Trap coil	RTF-152
	L103, L203	Trap coil	RTF-153
	L101, L201	MPX filter	RTF-138
	L302	Line coil	RTF-101
	L104, L204	Peaking coil (6.8mH)	RTF-126
	L102, L202	Coil (36mH)	RTF-092

CAPACITORS

Mark	Symbol & Description	Part No.
	C128, C228	CEAR10M50
	C126, C226	CEJAR15M50
	C129, C139, C229, C239	CEJAR33M50
	C127, C227	CEAR47M50
	C101, C103, C136, C140, C201, C203, C236, C240	CEA010M50
	C132, C232	CEA2R2M50
	C323	CEA4R7M50
	C115, C124, C133, C138, C148, C215, C224, C233, C238, C248, C327	CEA100M16
	C107, C130, C207, C230, C302, C303, C312 – C314, C330, C335	CEA330M16
	C304, C321, C326, C331, C322	CEA101M16
	C324, C325	CEA221M16
	C116, C216	CEA471M16
	C113, C114, C213, C214	CEANL010M50
	C105, C205, C109, C209	CEANL100M16
	C104, C204	CQSA821J50
	C307	CQPA183J100
	C131, C231	CCDSL101J50
	C141, C241, C149, C249	CKDYB471K50
	C301, C334, C336	CKDYF473Z50
	C305, C306	CCDSL101K500
	C102, C106, C202, C206	CCPSL101J50
	C311	CQMA682K50
	C308	CQMA223J50
	C112, C119, C137, C212, C219, C237	CQMA182J50
	C309, C310	CQMA332J50
	C121, C221	CQMA472J50
	C118, C145, C218, C245	CQMA822J50
	C111, C143, C211, C243	CQMA222J50
	C108, C123, C142, C144, C208, C223, C242, C244	CQMA103J50
	C110, C210	CQMA153J50
	C117, C122, C217, C222	CQMA273J50
	C120, C125, C220, C225	CQMA333J50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	V101, V102, V201, V202 Semi-fixed (22k-B)		VRTB6VS223
★	V301, V302	Semi-fixed (150k-B)	VRTB6VS154
★	V303	Semi-fixed (100-B)	RCP-031
⚠	R322		RS2LF680J
⚠	R304, R312		RD1/2PMF □□□J
	R101 – R106, R109 – R113, R115, R116, R169, R201 – R206, R209 – R213, R215, R216, R269, R301 – R303, R314, R315, R324, R337		RD1/4PM □□□J
	Other resistors		RD1/6PM □□□J

OTHERS

Mark	Symbol & Description		Part No.
	Terminal (LINE)		RKB–023
	Phone jack with switch (MIC)		RKN-087 (RKN-092)
★★	RY301	Reed relay	RSR-035

Power Supply Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠ ★	D402	1B2C1-LC2
⚠ ★	D401	1B2Z1-LC2
⚠ ★	D403, D406	1SR35-100A
⚠ ★	D404, D405	RD13EB2 (MTZ13B)

SWITCH

Mark	Symbol & Description		Part No.
⚠ ★★	S401	Push switch (POWER)	RSA-063

CAPACITORS

Mark	Symbol & Description		Part No.
⚠	C407	Cerami (0.01/AC400V)	RCG-009 (VCG-033) (VCG-044)
	C403, C406		CEA101M16
	C402		CEA101M25
	C405		CEA222M16
	C401, C407		CEA102M35

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
⚠	R401, R403, R404	RD1/2PMF □□□J
⚠	R402	RD1/4PM561J

Direction Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D701, D702	LD-603MG

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R701	RD1/4PM391J

Timer Unit

SWITCH

Mark	Symbol & Description		Part No.
★★	S801	Slide switch (TIMER)	RSH-064

Transistor A Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠ ★★	Q1001	2SD1265

Transistor B Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠ ★★	Q1101	2SD1265

Indicator Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q604, Q605	BA6124
★★	Q602	2SC1740S
★	D602, D607 – D609, D617 – D619	SEL4214S
★	D606, D610, D611, D615, D616, D620	SEL4914A
★	D603, D604, D612	SEL4414E
★	D613, D614	1SS254

SWITCHES

Mark	Symbol & Description		Part No.
★★	S604	Push switch (MODE)	RSG-173
★★	S602, S603	Push switch assembly C (DOLBY NR)	RSG-172
★★	S605 – S611	Push switch	RSG-155

CAPACITORS

Mark	Symbol & Description	Part No.
	C601, C602	CEA100M16

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	V601	Variable (REC LEVEL)	RCW-012
★	V602	Variable (BALANCE)	RCS-029
⚠	R609, R615		RD1/2PMF680J
	R603, R606, R610		RD1/4PM □□□J
	Other resistors		RD1/6PM □□□J

Control Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q509	PD2012
★★	Q523	M5218L
★★	Q512	M54543L
★★	Q513	2SD882
★★	Q510	2SA881
★★	Q515, Q516	2SC3243
★★	Q505 – Q508, Q514, Q521, Q522	2SC1740S
★★	Q501 – Q504, Q511	2SA933S
★	D510	RD3.6EB2
★	D511	RD5.6EB1 (MTZ5.6A)
★	D501, D503 – D505, D508, D509, D512, D513	1SS254
★	D506, D507	1SR35-100A

CAPACITORS

Mark	Symbol & Description	Part No.
	C504	CEAR47M50
	C510	CEA330M16
	C506	CEA100M16
	C502	CEA101M10
	C507	CQMA822J50
	C505	CEA220M16
	C503, C509	CKDYF103Z50
	C501, C508	CKDYF473Z50

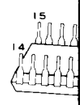
RESISTORS

Note: When o… into cod…

Mark	Symbol
★	V501
★	V502
⚠	R515
	R501, …
	R530, …
	R539
	Other r…

External App…

AN7370K
PD2012



M5220L
M5218L

2SA933SLN
2SA933S
2SC1740SLN
2SC1740S
Type N…

h…

2SC2240

Type No…

t the resistance value the part no. as before.

Part No.
VRTB6VS223
VRTB6VS154
RCP-031
RS2LF680J
RD1/2PMF □□□J
RD1/4PM □□□J
RD1/6PM □□□J

Part No.
RKB–023
RKN-087
(RKN-092)
RSR-035

Part No.
1B2C1-LC2
1B2Z1-LC2
1SR35-100A
RD13EB2
(MTZ13B)

Part No.
RSA-063

Part No.
RCG-009
(VCG-033)
(VCG-044)
CEA101M16
CEA101M25
CEA222M16
CEA102M35

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
⚠	R401, R403, R404	RD1/2PMF □□□J
⚠	R402	RD1/4PM561J

Direction Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D701, D702	LD-603MG

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R701	RD1/4PM391J

Timer Unit

SWITCH

Mark	Symbol & Description	Part No.
★★	S801 Slide switch (TIMER)	RSH-064

Transistor A Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠ ★★	Q1001	2SD1265

Transistor B Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠ ★★	Q1101	2SD1265

Indicator Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q604, Q605	BA6124
★★	Q602	2SC1740S
★	D602, D607 – D609, D617 – D619	SEL4214S
★	D606, D610, D611, D615, D616, D620	SEL4914A
★	D603, D604, D612	SEL4414E
★	D613, D614	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
★★	S604 Push switch (MODE)	RSG-173
★★	S602, S603 Push switch assembly C (DOLBY NR)	RSG-172
★★	S605 – S611 Push switch	RSG-155

CAPACITORS

Mark	Symbol & Description	Part No.
	C601, C602	CEA100M16

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	V601 Variable (REC LEVEL)	RCW-012
★	V602 Variable (BALANCE)	RCS-029
⚠	R609, R615	RD1/2PMF680J
	R603, R606, R610	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

Control Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q509	PD2012
★★	Q523	M5218L
★★	Q512	M54543L
★★	Q513	2SD882
★★	Q510	2SA881
★★	Q515, Q516	2SC3243
★★	Q505 – Q508, Q514, Q521, Q522	2SC1740S
★★	Q501 – Q504, Q511	2SA933S
★	D510	RD3.6EB2
★	D511	RD5.6EB1 (MTZ5.6A)
★	D501, D503 – D505, D508, D509, D512, D513	1SS254
★	D506, D507	1SR35-100A

CAPACITORS

Mark	Symbol & Description	Part No.
	C504	CEAR47M50
	C510	CEA330M16
	C506	CEA100M16
	C502	CEA101M10
	C507	CQMA822J50
	C505	CEA220M16
	C503, C509	CKDYF103Z50
	C501, C508	CKDYF473Z50

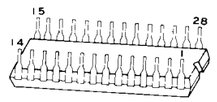
RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

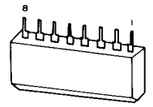
Mark	Symbol & Description	Part No.
★	V501 Semi-fixed (22k-B)	VRTG6HS223
★	V502 Semi-fixed (15k-B)	VRTB6VS153
⚠	R515	RS2LF200J
	R501, R511, R520, R522, R523, R530, R541	RD1/4PM □□□J
	R539 Thermo-Sensitive resistor	RCN-053
	Other resistors	RD1/6PM □□□J

External Appearance of Transistors and ICs

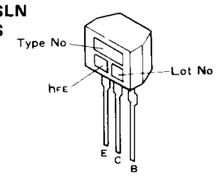
AN7370K
PD2012



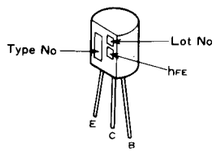
M5220L
M5218L



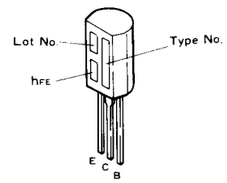
2SA933SLN
2SA933S
2SC1740SLN
2SC1740S



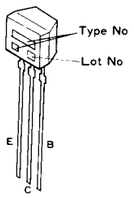
2SC2240



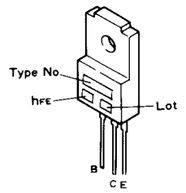
2SC3243



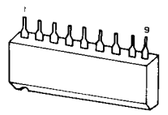
DTC143ES



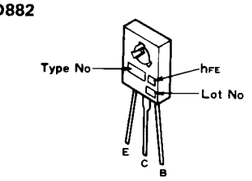
2SD1265



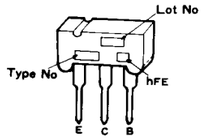
BA6124



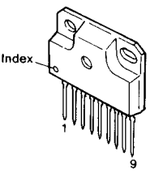
2SD882



2SA881



M54543L

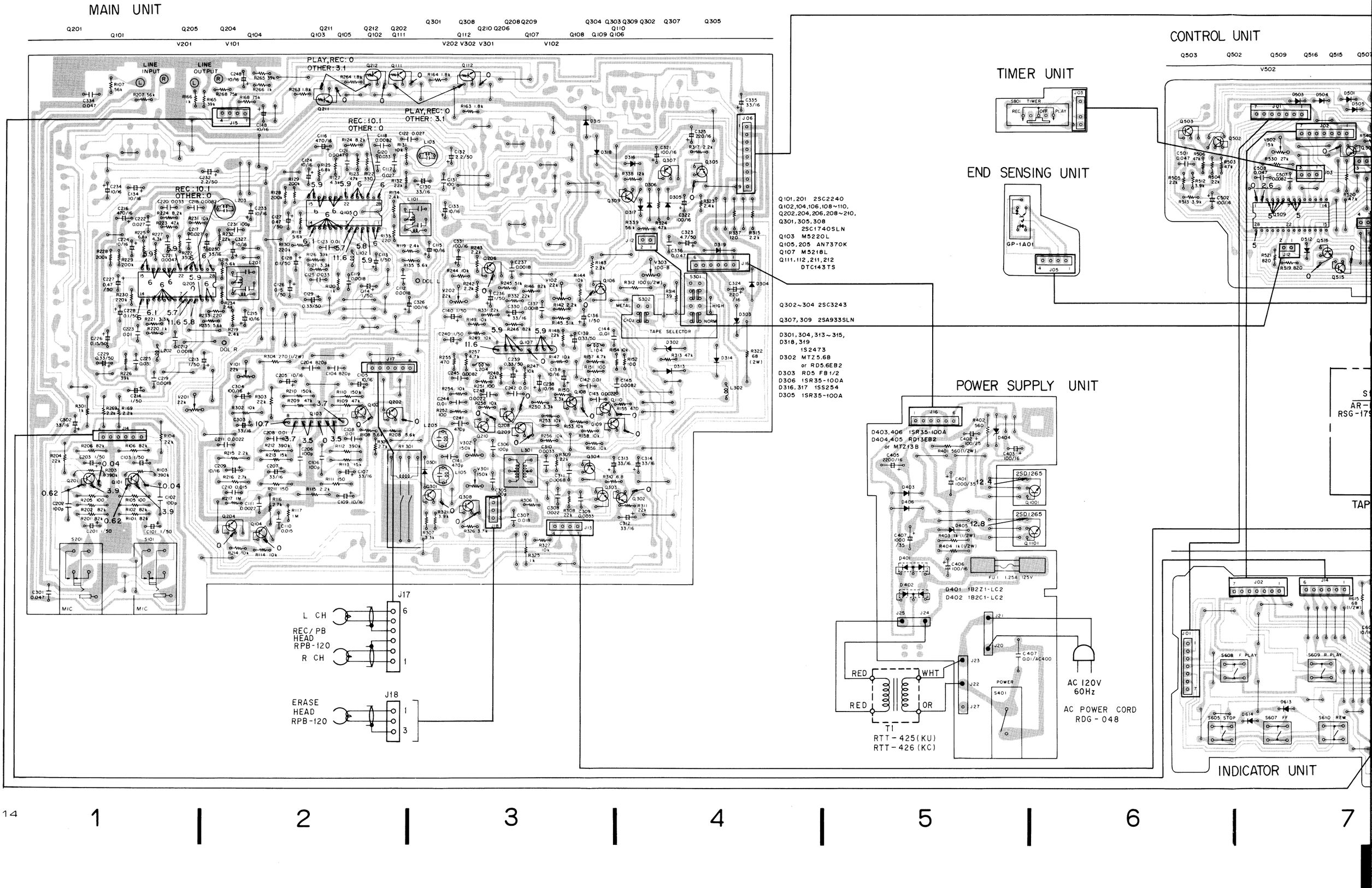


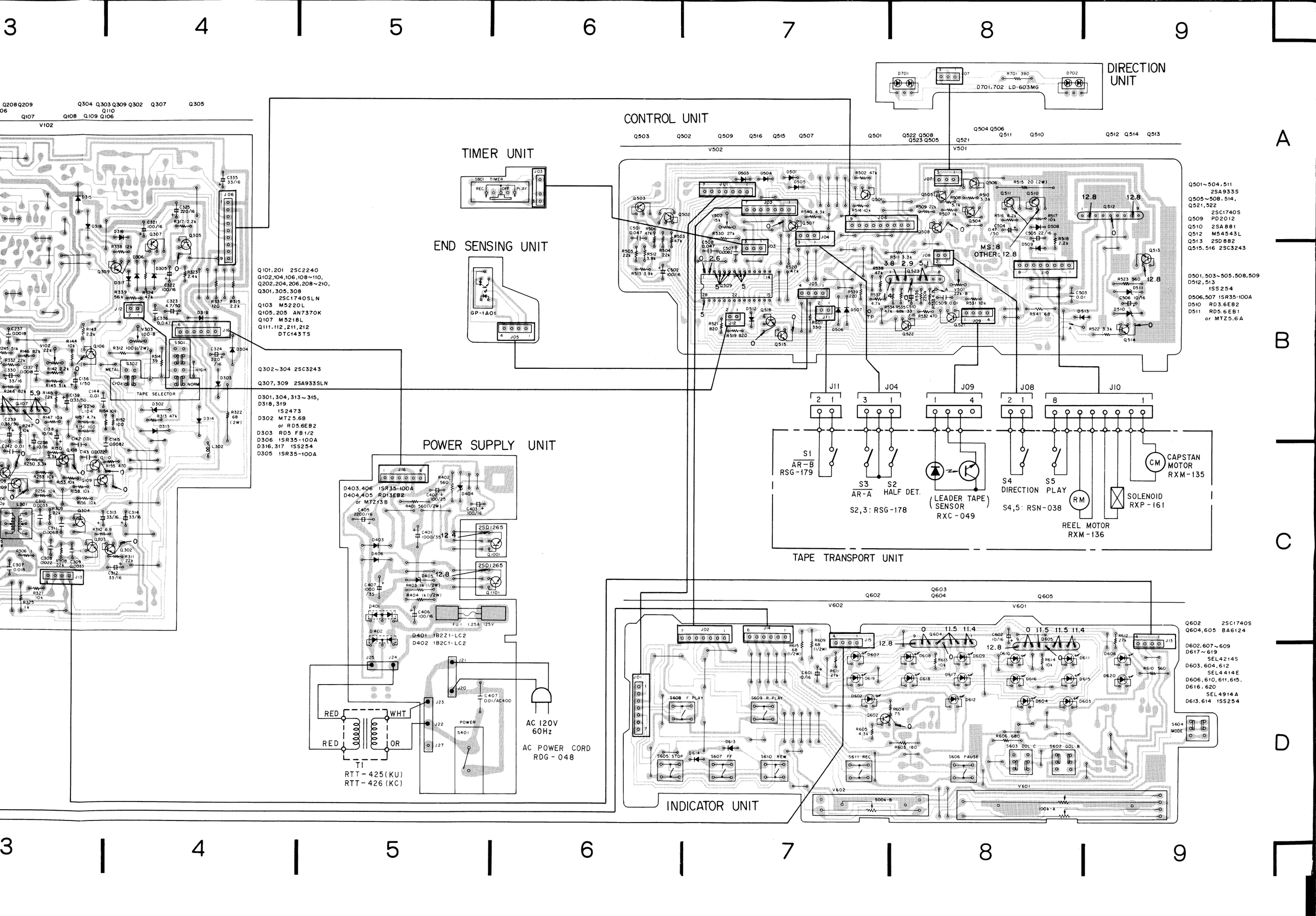
End Sensor Unit

SEMICONDUCTOR

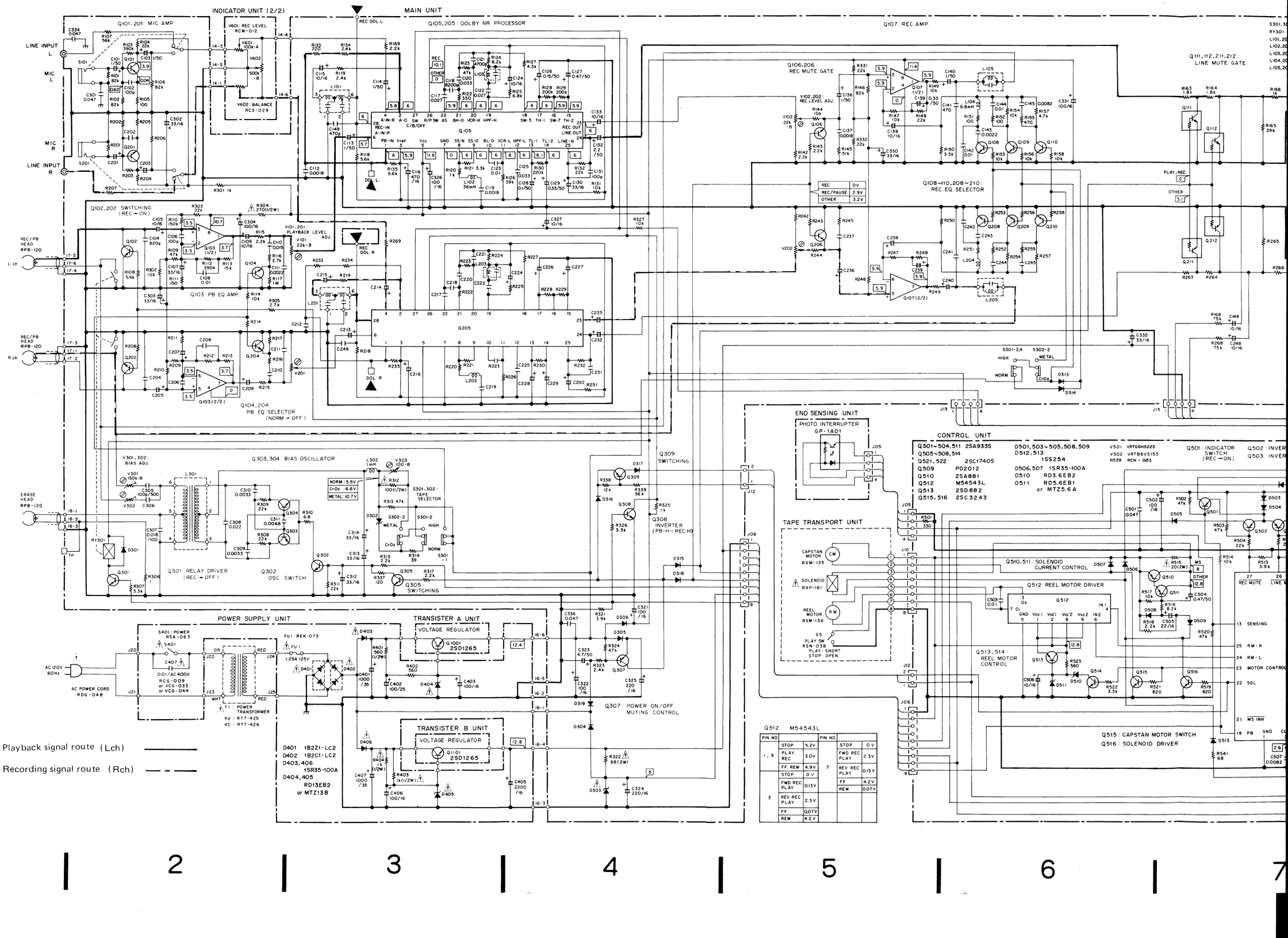
Mark	Symbol & Description	Part No.
★	Photo-interrupter	GP-1A01

6. P.C.BOARDS CONNECTION DIAGRAM

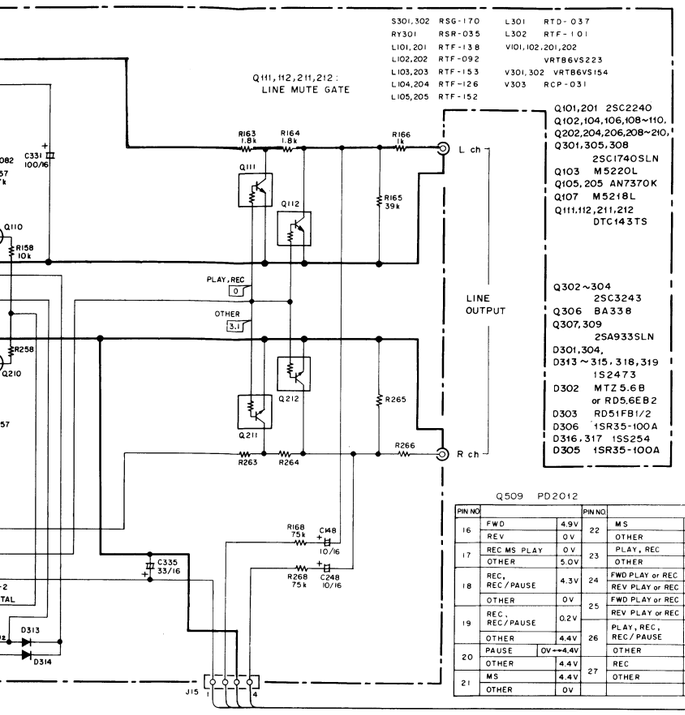



DIRECTION UNIT
D701,702 LD-603MG
CONTROL UNIT
TIMER UNIT
SB01 TIMER
REC. OFF PLAY
END SENSING UNIT
GP-1A01
POWER SUPPLY UNIT
TAPE TRANSPORT UNIT
S1 AR-B RSG-179
S3 AR-A
S2 HALF DET.
S2,3: RSG-178
(LEADER TAPE) SENSOR RXC-049
S4 DIRECTION
S5 PLAY
S4,5: RSN-038
CAPSTAN MOTOR RXM-135
SOLENOID RXP-161
REEL MOTOR RXM-136
INDICATOR UNIT
TAPE SELECTOR
METAL
HIGH
NORM
AC 120V 60Hz
AC POWER CORD RDG-048
T1
RTT-425(KU)
RTT-426(KC)
RED
WHT
OR
POWER
MS:8
OTHER:12.8
Q101,201 2SC2240
Q102,104,106,108~110, Q202,204,206,208~210, Q301,305,308 2SC1740SLN
Q103 M5220L
Q105,205 AN7370K
Q107 M5218L
Q111,112,211,212 DTC143TS
Q302~304 2SC3243
Q307,309 2SA933SLN
D301,304,313~315, D318,319 1S2473
D302 MTZ5.6B or RD5.6EB2
D303 RD5 FB1/2
D306 1SR35-100A
D316,317 1SS254
D305 1SR35-100A
D403,406 1SR35-100A
D404,405 RD13EB2 or MTZ13B
D401 1B2Z1-LC2
D402 1B2C1-LC2
Q501~504,511 2SA933S
Q505~508,514, Q521,522 2SC1740S
Q509 PD2012
Q510 2SA881
Q512 M54543L
Q513 2SD882
Q515,516 2SC3243
D501,503~505,508,509 D512,513 1SS254
D506,507 1SR35-100A
D510 RD3.6EB2
D511 RD5.6EB1 or MTZ5.6A
Q602 2SC1740S
Q604,605 BA6124
D602,607~609 D617~619 SEL4214S
D603,604,612 SEL4414E
D606,610,611,615, D616,620 SEL4914A
D613,614 1SS254

7. SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



S301,302	RSG-170	L301	RTD-037
RY301	RSR-035	L302	RTF-101
L101,201	RTF-138	V101,102,201,202	VRT86VS223
L102,202	RTF-092		
L103,203	RTF-153	V301,302	VRT86VS154
L104,204	RTF-126	V303	RCP-031
L105,205	RTF-152		

Q101,201 2SC2240
Q102,104,106,108~110,
Q202,204,206,208~210,
Q301,305,308
2SC1740SLN
Q103 M5220L
Q105,205 AN7370K
Q107 M5218L
Q111,112,211,212
DTC143TS

Q302~304
2SC3243
Q306 BA338
Q307,309
2SA933SLN
D301,304,
D313~315,318,319
1S2473
D302 MTZ5.6B
or RD5.6EB2
D303 RD51FB1/2
D306 1SR35-100A
D316,317 1SS254
D305 1SR35-100A

Q509 PD2012

PIN NO				PIN NO		
16	FWD	4.9V		22	MS	4.4V
	REV	0V			OTHER	0V
17	REC MS PLAY	0V		23	PLAY, REC	4.3V
	OTHER	5.0V			OTHER	0V
18	REC, REC/PAUSE	4.3V		24	FWD PLAY or REC	0V
	OTHER	0V			REV PLAY or REC	4.4V
19	REC, REC/PAUSE	0.2V		25	FWD PLAY or REC	4.4V
	OTHER	4.4V			REV PLAY or REC	0V
20	PAUSE	0V→4.4V		26	PLAY, REC, REC/PAUSE	4.4V
	OTHER	4.4V			OTHER	0.2V
21	MS	4.4V		27	REC	4.3V
	OTHER	0V			OTHER	0.2V

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE :
: DC voltage (V) at no input signal

4. OTHERS:
➡ Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
⚠ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:

MAIN UNIT

S101 :	MIC L	MIC — LINE
S201 :	MIC R	MIC — LINE
S301 :	TAPE SELECTOR	NORM — HIGH
S302 :	TAPE SELECTOR	CrO2 — METAL

POWER SUPPLY UNIT

S401 :	POWER	ON — OFF

INDICATOR UNIT

S602 :	DOLBY NR B	ON — OFF
S603 :	DOLBY NR C	ON — OFF
S604 :	MODE	⇌ — ⬭
S605 :	STOP	N.O. (NORMAL OFF)
S606 :	PAUSE	N.O.
S607 :	FF	N.O.
S608 :	FWD PLAY	N.O.
S609 :	REV PLAY	N.O.
S610 :	REW	N.O.
S611 :	REC	N.O.

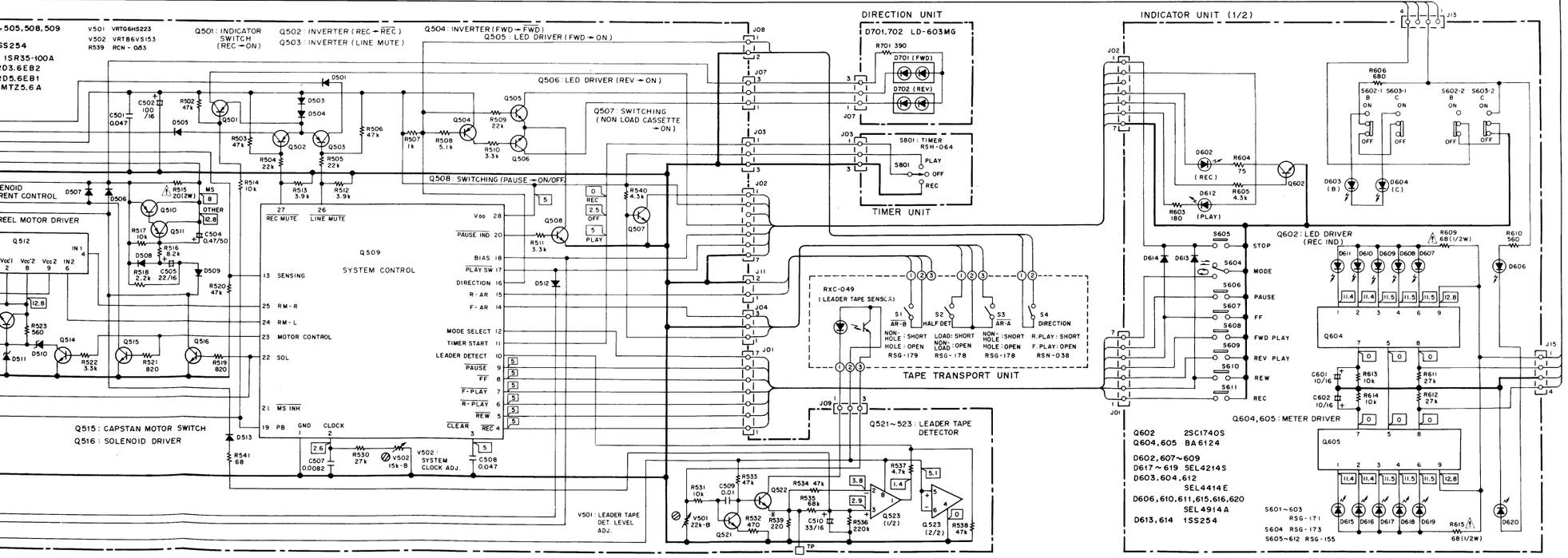
TIMER UNIT

S801 :	TIMER	REC — OFF — PLAY

TAPE TRANSPORT UNIT

S1 :	ERASE PREVENT DETECTOR (REV)	OFF (HOLE) — ON (NON HOLE)
S2 :	CASSETTE HALF DETECTOR	OFF (NON LOAD — ON (LOAD)
S3 :	ERASE PREVENT DETECTOR (FWD)	OFF (HOLE) — ON (NON HOLE)
S4 :	PLAY DIRECTION DETECTOR	OFF (FWD) — ON (REV)
S5 :	PLAY DETECTOR	OFF (STOP) — ON (PLAY)

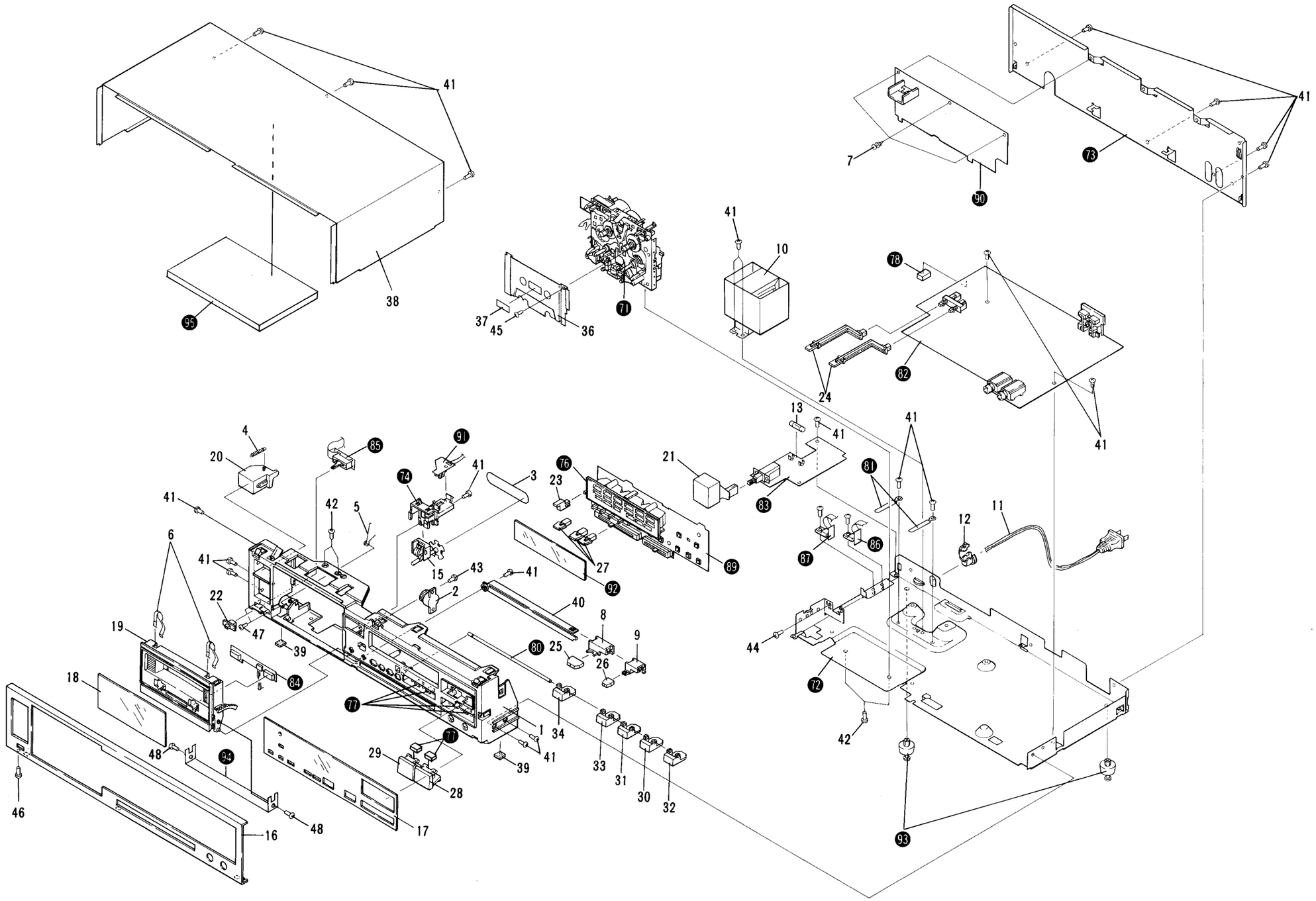
The underlined indicates the switch position.



Q602	2SC1740S
Q604,605	BA6124
D602,607~609	
D617~619	SEL4214S
D603,604,612	
	SEL4414E
D606,610,611,615,616,620	
	SEL4914A
D613,614	1SS254

S601~603 RSG-171
S604 RSG-173
S605~612 RSG-155

8. EXPLODED VIEW



Mark	No.	Part No
	1	RNT-06
	2	REC-43
★★	3	REB-49
	4	RBL-15
	5	RBL-15
	6	RBK-15
	7	RBM-06
	8	RNM-0
	9	RNM-0
⚠ ★	10	RTT-42
⚠	11	RDG-04
⚠	12	REC-39
⚠ ★★	13	REK-01
	14	
	15	RAW-2
	16	RAH-74
		RAH-74
	17	RAH-63
		RAH-63
		RAH-63
	18	RAH-63
		RAH-63
		RAH-63
	19	RNM-0
		RNM-0
		RNM-0
		RNM-0
	20	RAC-60
	21	RAC-51
	22	RAC-60
		RAC-60
	23	RAC-60
	24	RAC-60
	25	RAC-60
		RAC-60
	26	RAC-60
		RAC-6
	27	RAC-60
	28	RAC-6
	29	RAC-6
	30	RAC-6

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ *GENERALLY MOVES FASTER THAN* ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

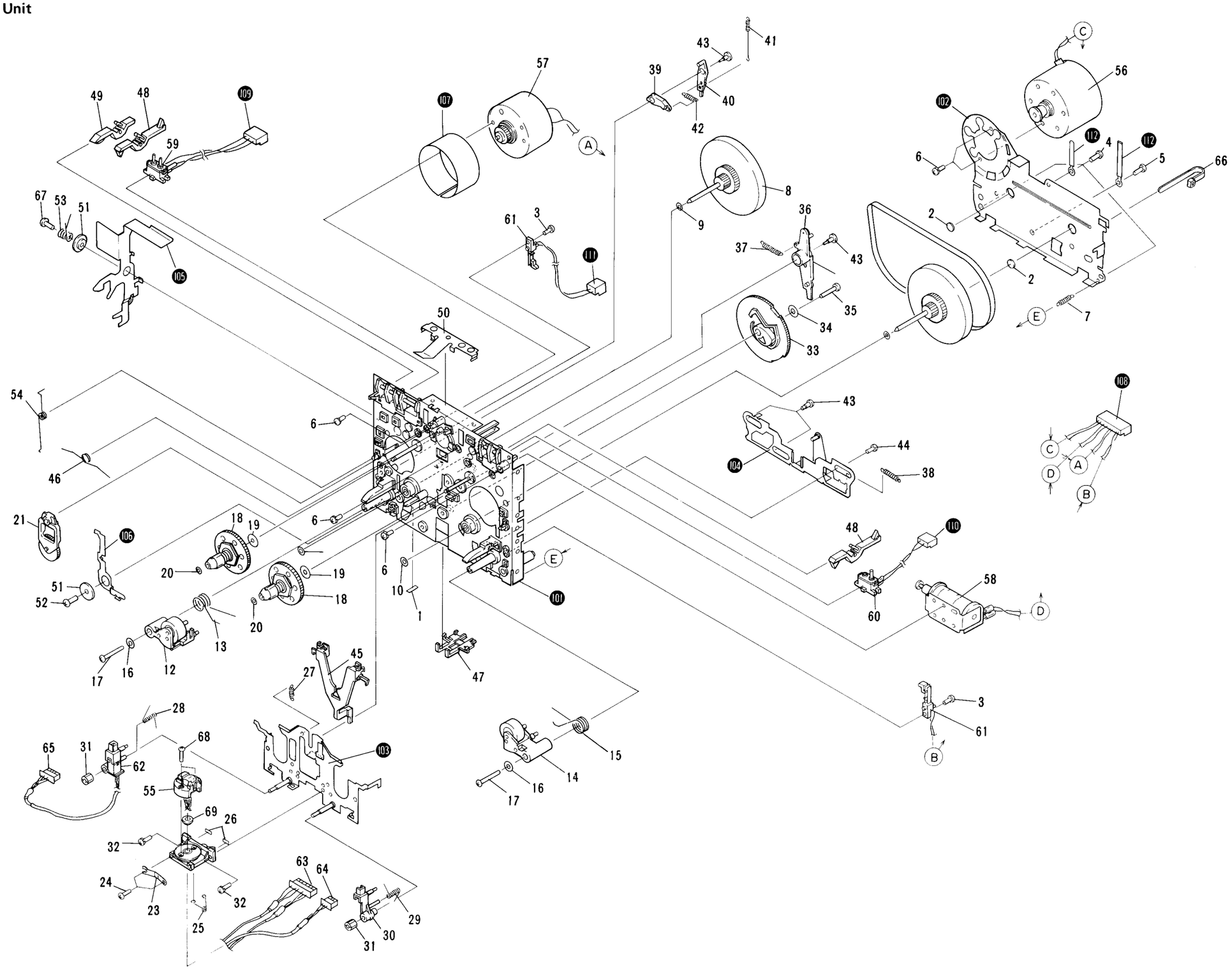
Mark	No.	Part No.	Descripton
	1	RNT-061	Panel stay
	2	REC-436	Door damper
★★	3	REB-492	Counter belt
	4	RBL-154	Eject spring
	5	RBL-157	Door spring
	6	RBK-196	Hold spring
	7	RBM-003	Nylon rivet
	8	RNM-076	VR slider A
	9	RNM-077	VR slider B
⚠ ★	10	RTT-425	Power transformer (120V)
⚠	11	RDG-048	AC power cord
⚠	12	REC-395	Strain relief
⚠ ★★	13	REK-073	Fuse (1.25A)
	14		.....
	15	RAW-215	Tape counter
	16	RAH-745	Front panel (black)
		RAH-746	Front panel (silver)
	17	RAH-682	Display panel (CT-S55R, CT-S55R[BK], CT-1160R[BK]/D)
		RAH-681	Display panel (CT-1160R)
		RAH-680	Display panel (CT-1160R [BK] without D type)
	18	RAH-685	Door panel (CT-S55R, CT-S55R[BK], CT-1160R[BK]/D)
		RAH-684	Door panel (CT-1160R)
		RAH-683	Door panel (CT-1160R[BK] without D type)
	19	RNM-074	Door pocket (CT-S55R)
		RNM-073	Door pocket (CT-S55R [BK])
		RNM-072	Door pocket (CT-1160R)
		RNM-071	Door pocket (CT-1160R [BK])
	20	RAC-605	Knob (EJECT)
	21	RAC-576	Knob (POWER)
	22	RAC-603	Knob (TIMER) (black)
		RAC-604	Knob (TIMER) (silver)
	23	RAC-606	Knob (MODE)
	24	RAC-602	Knob (TAPE SELECTOR)
	25	RAC-607	Knob (REC LEVEL) (black)
		RAC-608	Knob (REC LEVEL) (silver)
	26	RAC-609	Knob (BALANCE) (black)
		RAC-610	Knob (BALANCE) (silver)
	27	RAC-600	Knob (DOLBY NR)
	28	RAC-612	Knob (FWD PLAY)
	29	RAC-614	Knob (REV PLAY)
	30	RAC-615	Knob (FF)

Mark	No.	Part No.	Description
	31	RAC-616	Knob (REW)
	32	RAC-617	Knob (STOP)
	33	RAC-618	Knob (REC)
	34	RAC-620	Knob (PAUSE)
	35	.....	
	36	RAH-689	Cassette plate
	37	REE-104	Remain display paper
	38	RNA-772	Bonnet case (black)
		RNA-773	Bonnet case (silver)
	39	REB-513	Skid
	40	RNM-075	Knob guide
	41	BBZ30P080FMC	Screw 3 x 8
	42	CBZ30P080FZK	Screw 3 x 8
	43	ARZ26P060FMC	Screw 2.6 x 6
	44	PMA30P060FMC	Screw 3 x 6
	45	BCT26P100FZK	Screw 2.6 x 10
	46	BBT30P060FZK	Screw 3 x 6
	47	PMZ26P060FMC	Screw 2.6 x 6
	48	ABZ26P080FZK	Screw 2.6 x 8
	71		Tape transport unit
	72		Chassis
	73		Rear panel
	74		Counter holder
	75	.....	
	76		LED holder
	77		Cushion
	78		Spacer
	79	.....	
	80		Knob shaft
	81		Cord fixer
	82		Main unit
	83		Power supply unit
	84		Direction unit
	85		Timer unit
	86		Transistor A unit
	87		Transistor B unit
	88	.....	
	89		Indicator unit
	90		Control unit
	91		End sensor unit
	92		Meter panel
	93		Leg assembly
	94		Door bracket
	95		Bonnet sheet

Parts List of Tape Transport Unit

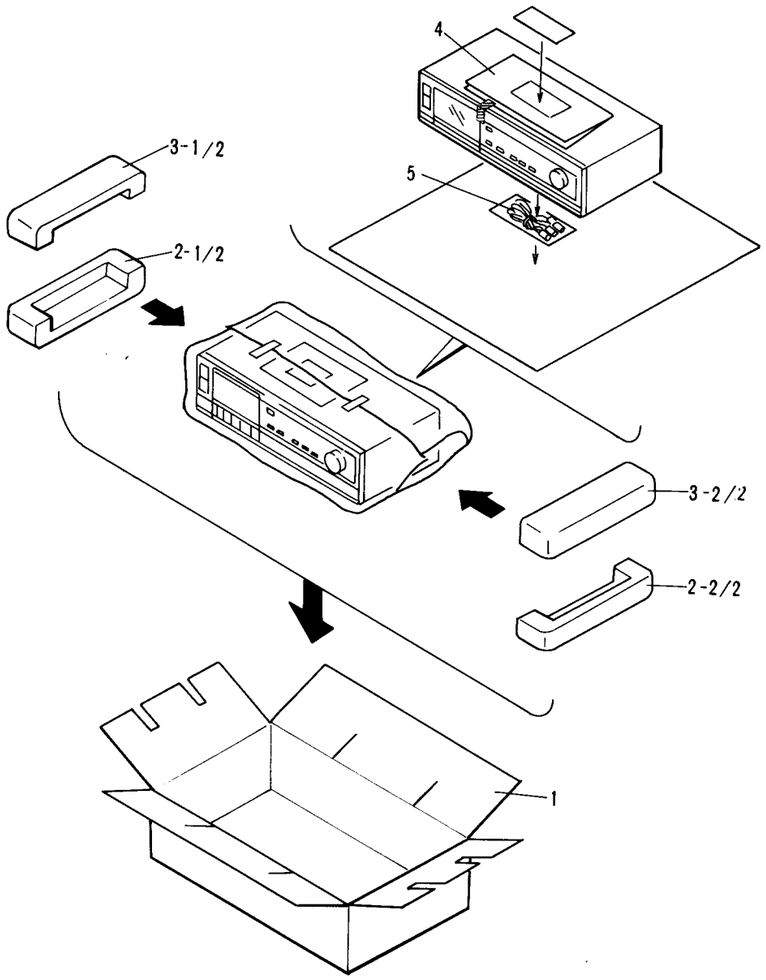
Mark	No.	Part No.	Description
	1	REF-025	Reflection plate
	2	REC-439	Spacer
	3	PRZ20P060FMC	Screw 2 x 6
	4	PRZ26P080FMC	Screw 2.6 x 8
	5	PCZ30P040FMC	Screw 3 x 4
	6	PMA26P040FMC	Screw 2.6 x 4
	7	RBL-148	Grouding spring
	8	RXC-083	Flywheel assembly
	9	WA26D045D025	Washer
	10	RBF-030	Oil stopper washer
★★	11	REB-540	Main belt
★★	12	RXC-084	Pinch roller assembly (L)
	13	RBL-138	Pinch roller spring (L)
★★	14	RXC-085	Pinch roller assembly (R)
	15	RBL-139	Pinch roller spring (R)
	16	WA23F060M040	Washer
	17	PRZ20P130FMC	Screw 2 x 13
	18	RXC-040	Reel base assembly
	19	WA21D070D013	Washer
	20	RBF-057	Washer
★★	21	RXC-086	Idler assembly
	22	RXC-088	Head housing assembly
	23	RBK-184	Azimuth spring
	24	RBA-092	Azimuth screw
	25	RBL-085	Rotator spring
	26	RNH-389	Spacer
	27	RBL-140	Eject arm spring
	28	RBL-087	Spring (L)
	29	RBL-088	Spring (R)
	30	RNL-929	Tape guide
	31	RNL-930	Nut
	32	PMA20P050FMC	Screw 2 x 5
	33	RNM-112	Cam gear
	34	WA23F060M040	Washer
	35	PRZ20P130FMC	Screw 2 x 13
	36	RXC-089	Play arm assembly
	37	RBL-141	Play arm spring
	38	RBL-142	Slide spring
	39	RNM-114	Arm (A)
	40	RNM-115	Arm (B)
	41	RBL-143	Turn spring
	42	RBL-144	Arm spring (A)
	43	RNM-116	Cap pin
	44	RLB-590	Cap pin
	45	RNM-118	Hold lever
	46	RBL-145	Hold spring
	47	RNM-123	Wire holder
	48	RNM-119	REC detector lever
	49	RNM-120	Half detector lever
	50	RBK-194	Hold spring
	51	RLB-558	Spacer
	52	PCZ30P080FMC	Screw 3 x 8
	53	RBL-146	Eject arm spring
	54	RBL-147	Eject prevention spring (L)
★★	55	RPB-120	Tape head assembly
★★	56	RXM-135	Capstan motor
★★	57	RXM-136	Reel motor
⚠ ★	58	RXP-161	Solenoid
★★	59	RSG-178	Push switch (S2, S3)
★★	60	RSG-179	Push switch (S1)
★★	61	RSN-038	Spring switch (S4, S5)
	62	RXC-049	Sensor assembly
	63	RKS-033	Wire connector 6-P
	64	RKS-034	Wire connector 3-P
	65	RKS-035	Wire connector 4-P
	66	REC-371	Wire tie
	67	RBA-094	Screw
	68	PMZ14P050FNi	Screw 1.4 x 5
	69	REB-521	Cushion
	101		Chassis
	102		Motor bracket
	103		Head base assembly
	104		Slide plate
	105		Eject arm (L)
	106		Eject prevention arm (L)
	107		Shield plate
	108		Wire connector 8-P
	109		Wire connector 3-P
	110		Wire connector 2-P
	111		Wire connector 2-P
	112		Cord fixer

Tape Transport Unit



9. PACKING

Mark	No.	Part No.	Description
	1	RHG-825	Packing case (CT-S55R[BK])
		RHG-826	Packing case (CT-S55R)
		RHG-823	Packing case (CT-1160R[BK])
		RHG-824	Packing case (CT-1160R)
	2	RHA-274	Pad A
	3	RHA-275	Pad B
	4	RRB-262	Operating instructions (CT-S55R, English)
		RRB-261	Operating instructions (CT-1160R, English)
	5	RDE-010	Connection cord

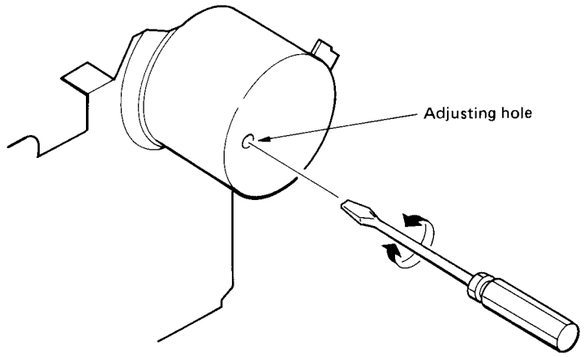


10. ADJUSTMENTS

10.1 MECHANICAL ADJUSTMENT

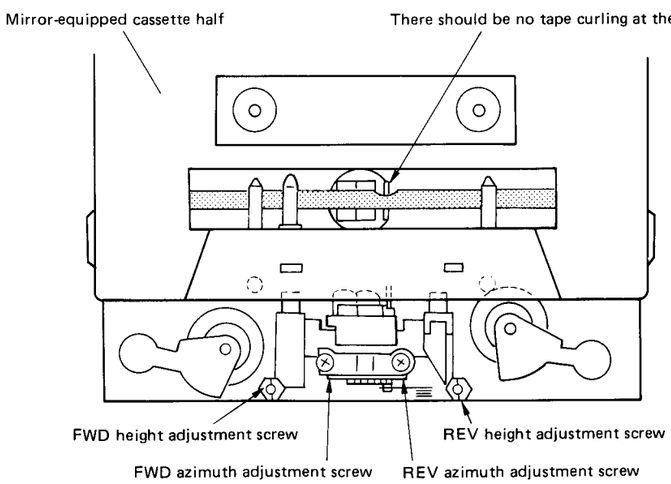
1. Tape Speed Adjustment

Mode	Test tape	Adjustment position	Specification rating (playback frequency)
PLAY	Play the STD-301 tape (3kHz)	Variable resistor control	3000Hz ± 5Hz



2. Tape Transport Adjustment

Mode	Adjustment position	Specifications
FWD STOP	FWD azimuth adjustment screw	With the frame door open, the head should be visually parallel with the tape direction.
REV STOP	REV azimuth adjustment screw	
Load a mirror-equipped cassette half, and lift the head base by hand so that the tape touches the tape guide.		
STOP	Height adjustment screws (both left and right)	Check (visually) that the tape is located in the center of the tape guide.
FWD PLAY	FWD height adjustment screw	Adjust the first tape guide to ensure that there is no tape curling.
REV PLAY	REV height adjustment screw	


Mirror-equipped cassette half
There should be no tape curling at the tape guide
FWD height adjustment screw
REV height adjustment screw
FWD azimuth adjustment screw
REV azimuth adjustment screw

10.2 ELECTRICAL ADJUSTMENT

Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The head must be cleaned and demagnetized.
3. Allow the deck to age for at least a few minutes before commencing any electrical adjustments.
4. The reference signal is 0dB=1Vrms.
5. Connect a 50 kilo-ohm (or between 47 to 52 kilo-ohm) load resistance to the OUTPUT terminals.
6. Unless otherwise specified, the switches listed below are left in the positions indicated.
   DOLBY NR : OFF
   TAPE SELECTOR : NORM

Test Tapes

STD-331B : Playback adjustments (See Fig. 10-1)
STD-608A : NORMAL blank tape
STD-603 : CrO_2 blank tape
STD-610 : METAL blank tape

List of Adjustments

1. Head azimuth adjustment.
2. Playback equalizer check.
3. Playback level adjustment.
4. Leader tape detector adjustment.
5. Level meter check.
6. Erasure current adjustment.
7. Recording and playback frequency response adjustment.
8. Recording level adjustment.

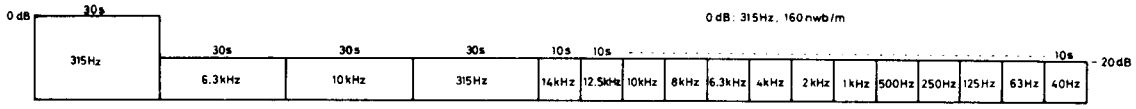


Fig. 10-1 Contens of the test tape STD-331B

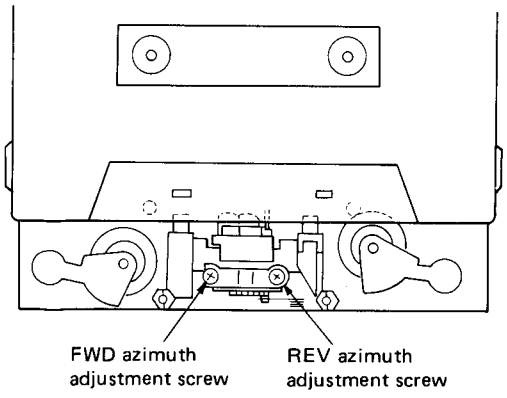


Fig. 10-2 Head azimuth adjustment

Test tape	STD-331B
Tape selector	NORM
DOLBY NR switch	OFF

• Due to "edge effect", compensate the right changed by -1dB at 63Hz.

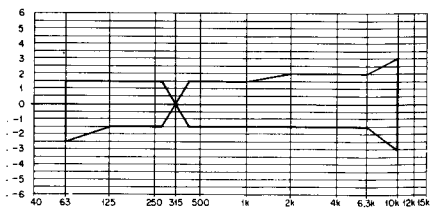


Fig. 10-3 Allowable playback frequency response zone

- **Set the DOLBY NR switch to the OFF position.**

1. Head Azimuth Adjustment
- Turn V101 and V201 to maximum position (fully clockwise).

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY (FWD, REV)	Play the 10kHz/–20dB section of the STD-331B test tape.	Head azimuth adjustment screw. (See Fig. 10-2)	Left and right OUTPUT terminals.	Maximum playback signal level.	
3	STOP	Lock the screw with screw lock after completing the adjustment.				

2. Playback Equalizer Check

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY	Play the 315Hz/–20dB and 6.3kHz/–20dB section of the STD-331B test tape.	Confirm	Left and right OUTPUT terminals.	The 6.3kHz playback level is –0.5±2dB against 315Hz level.	

3. Playback Level Adjustment
- This adjustment determines the DOLBY NR level, and must be performed with great care.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY	Play the 315Hz/0dB section of the STD-331B test tape.	V101 (Left channel) V201 (Right channel)	TP.DOL L (L ch.) TP.DOL R (R ch.)	–17.9dBv (127.3mV)	

4. Leader Tape Detector Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	PLAY	Load a cassette half without tape.	V501 (Control unit)	TP.LEADER (Control unit)	1.35V±0.05V (DC)	

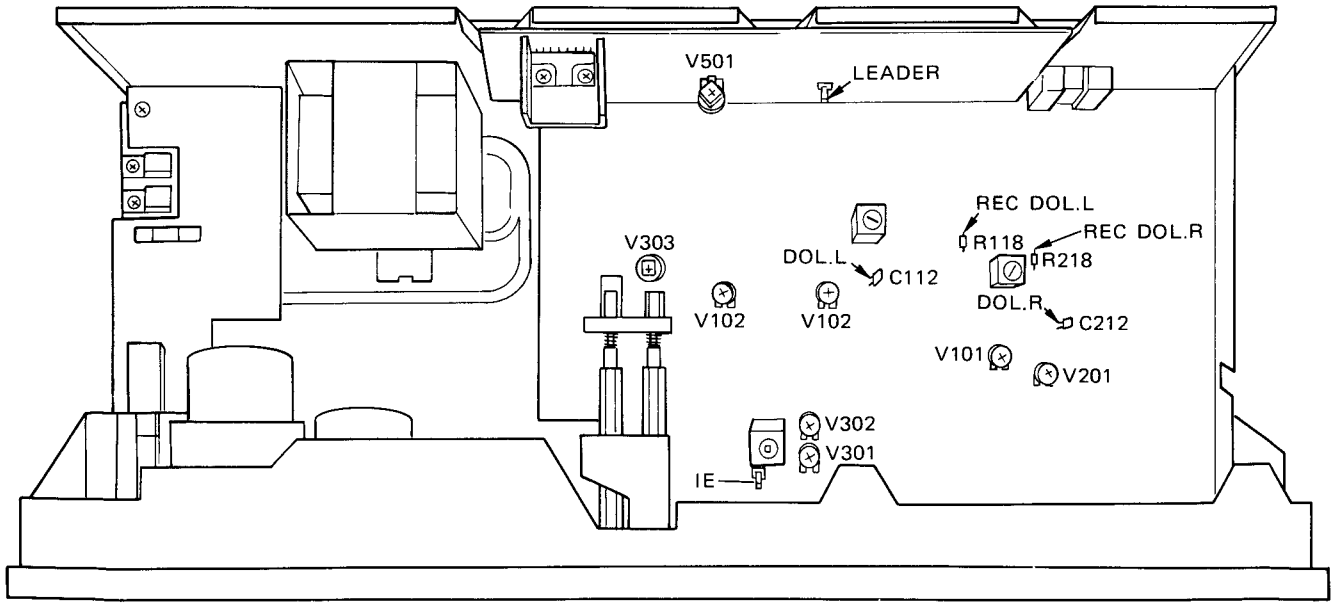


Fig. 10-4 Adjustments locations

5. Level Meter Check

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 315Hz/−10dBv (316mV) signal to the LINE INPUT terminals.	REC LEVEL control	TP.DOL L (L ch.) TP.DOL R (R ch.)	Check that the level meters "0dB" light up within −17.9dBv±1.8dB of the signal output level.	

6. Erasure Current Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC	Load the STD-610 standard tape without an input signal.	V303	TP.IE	170mV±5mV AC	

7. Recording and Playback Frequency Response Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	REC-PAUSE	Apply a 315Hz/−30dBv (31.6mV) signal to the LINE INPUT terminals.	REC LEVEL control	TP.DOL L (L ch.) TP.DOL R (R ch.)	−37.9dBv (12.7mV)	
3	REC/PLAY	Record the above signal level onto the STD-608A test tape at 315Hz and 6.3kHz, and playback.	V302 (Left channel) V301 (Right channel)	Left and right OUTPUT terminals.	The 6.3kHz playback level is +1.0dB against 315Hz level (Playback the signals recorded on the STD-608A)	
4		Change the test tape, tape selector and DOLBY NR switch positions, and check that the frequency response is satisfactory (See Fig. 10-5). If the response does not lie within the specified range, readjust V302 and V301 that the 6.3kHz playback level is 0~+1.5dB against 315Hz level in the step 3.				

8. Recording Level Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	REC-PAUSE	Apply a 315Hz/−10dBv (316mV) signal to the LINE INPUT terminals.	REC LEVEL control	TP.DOL L (L ch.) TP.DOL R (R ch.)	−17.9dBv (127.3mV)	
3		Set the DOLBY NR switch to the ON position.				
4	REC/PLAY	Record the above signal level onto the STD-608A test tape, and playback.	V102 (Left channel) V202 (Right channel)	TP.DOL L (L ch.) TP.DOL R (R ch.)	−17.9dBv (127.3mV)	
5		Set the TAPE SELECTOR switch to the CrO_2 position.				
6		Record the above signal onto the STD-603 test tape, and playback.	Confirm	TP.DOL L (L ch.) TP.DOL R (R ch.)	−17.9dBv ± 1.5dB	
7		Set the TAPE SELECTOR switch to the METAL position.				
8		Record the above signal onto the STD-610 test tape, and playback.	Confirm	TP.DOL L (L ch.) TP.DOL R (R ch.)	−17.9dBv ± 1.5dB	

Test Tape: STD-608A
TAPE SELECTOR: NORM

DOLBY NR: OFF	DOLBY NR: B-TYPE ON	DOLBY NR: C-TYPE ON

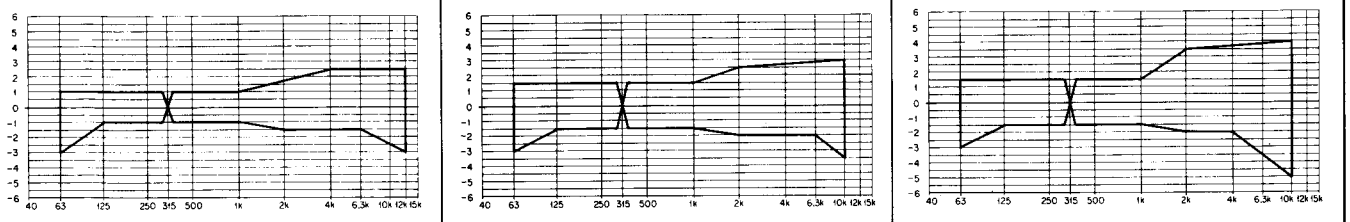


Fig. 10-5-1 Allowable recording and playback frequency response zone (NORM)

Test Tape: STD-603
TAPE SELECTOR: CrO_2

DOLBY NR: OFF	DOLBY NR: B-TYPE ON	DOLBY NR: C-TYPE ON

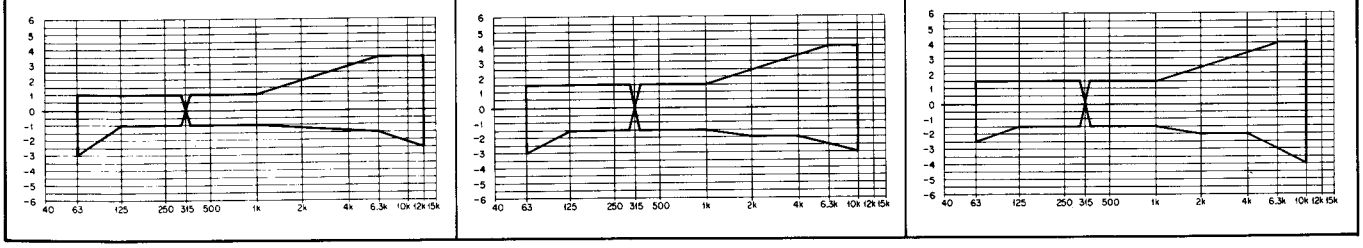


Fig. 10-5-2 Allowable recording and playback frequency response zone (CrO_2)

Test Tape: STD-610
TAPE SELECTOR: METAL

DOLBY NR: OFF	DOLBY NR: B-TYPE ON	DOLBY NR: C-TYPE ON

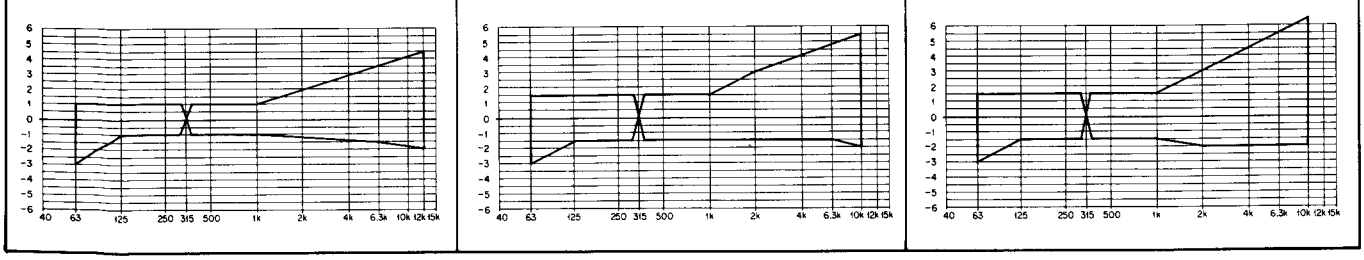


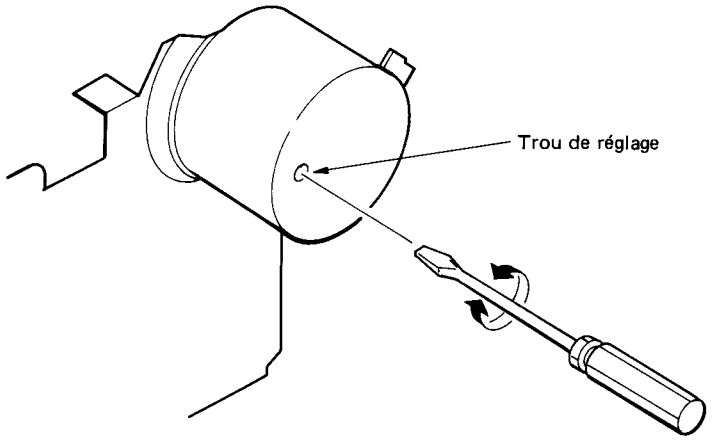
Fig. 10-5-3 Allowable recording and playback frequency response zone (METAL)

10. RÉGLAGE

10.1 RÉGLAGES MÉCANIQUES

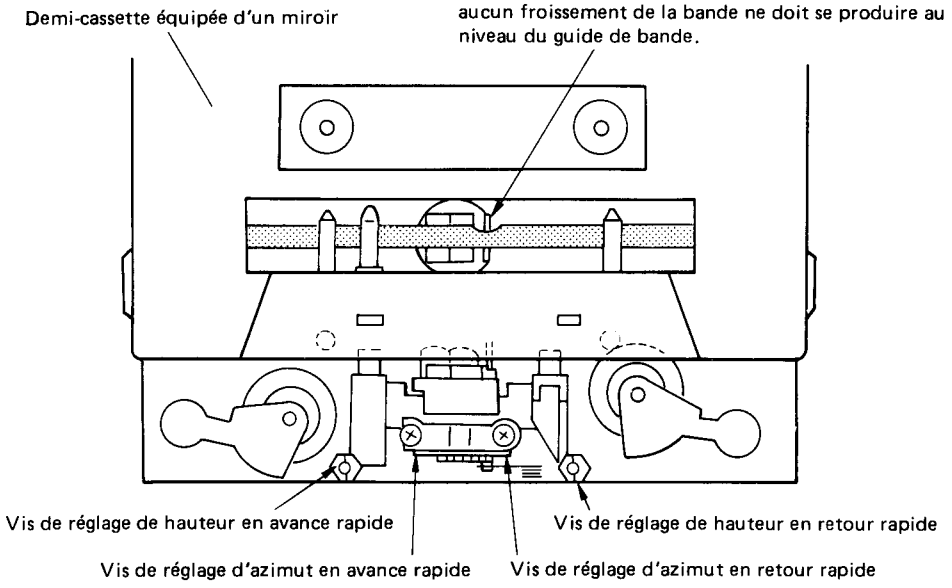
1. Réglage de la vitesse de défilement de la bande

Mode	Bande d'étalonnage	Position de réglage	Spécifications nominales (fréquence de lecture)
LECTURE	Lire la bande STD-301 (3kHz)	Contrôle à résistance variable	3000Hz±5Hz



2. Réglage de transport de bande

Mode	Position de réglage	Spécifications nominales
AVANCE RAPIDE ARRÊT	Vis de réglage d'azimut en avance rapide.	Lorsque la trappe est ouverte, la tête doit être vue en position parallèle par rapport au sens de défilement de la bande.
RETOUR RAPIDE ARRÊT	Vis de réglage d'azimut en retour rapide.	
Charger une demi-cassette à miroir et soulever l'embase de la tête pour que la bande touche le guide de bande.		
ARRÊT	Vis de réglage de hauteur (droite et gauche).	Effectuer un contrôle (visuel) pour s'assurer que la bande est placée au centre du guide de bande.
AVANCE RAPIDE LECTURE	Vis de réglage de hauteur en avance rapide.	Ajuster le premier guide de bande pour qu'aucun froissement de la bande ne se produise.
RETOUR RAPIDE LECTURE	Vis de réglage de hauteur en retour rapide.	


Demi-cassette équipée d'un miroir
aucun froissement de la bande ne doit se produire au niveau du guide de bande.
Vis de réglage de hauteur en avance rapide
Vis de réglage de hauteur en retour rapide
Vis de réglage d'azimut en avance rapide
Vis de réglage d'azimut en retour rapide

10.2 RÉGLAGES ÉLECTRIQUES

Conditions nécessaires pour effectuer les réglages

1. Les réglages des mécanismes doivent avoir été faits avant.
2. La tête magnétique doit être propre et démagnétisée.
3. La platine-cassette doit avoir fonctionnée pendant quelques minutes avant de commencer les réglages électriques.
4. Le signal de référence est de 0dB=1V effi.
5. Raccorder une résistance de charge de 50 k-ohms (ou de 47 à 52 k-ohms) aux prises de sortie "OUTPUT".
6. A moins d'une indication contraire, les commutateurs mentionnés ci-dessous doivent se trouver dans la position indiquée.
   DOLBY NR : Sur OFF
   TAPE SELECTOR : Sur NORM

Bandes de mesure

STD-331B : Réglage de lecture (Fig. 10-1)
STD-608A : Bande vierge ordinaire (NORMAL)
STD-603 : Bande vierge au chrome (CrO_2)
STD-610 : Bande vierge au fer (METAL)

Liste des réglages à exécuter

1. Réglage d'azimut de tête magnétique
2. Contrôle de l'égaliseur de lecture
3. Réglage de niveau de lecture
4. Réglage du détecteur de bande-amorce
5. Contrôle de fonctionnement de décibelmètre
6. Réglage du courant d'effacement
7. Calage de réponse en fréquence d'enregistrement et de lecture
8. Réglage du niveau d'enregistrement

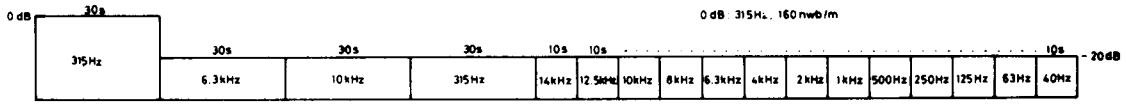


Fig. 10-1 Signaux préenregistrés sur la bande d'étalonnage STD-331B

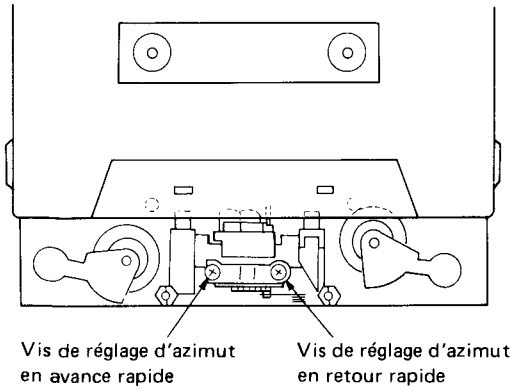


Fig. 10-2 Réglage d'azimut de tête magnétique

Bande d'étalonnage	STD-331B
Sélecteur de bande	NORM
Commutateur DOLBY NR	OFF

• A cause de "l'effet d'aréte", compenser le canal droit de −1dB à 63Hz.

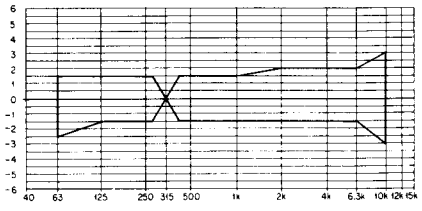


Fig. 10-3 Réponse en fréquence admissible en lecture

- Placer le sélecteur DOLBY NR en position OFF.

1. Réglage d'azimut de tête magnétique.
- Tourner V101 et V201 sur leur position maximum (dans le sens maximum des aiguilles d'une montre)

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE (AVANCE RAPIDE, RETOUR RAPIDE)	Lire le passage préenregistré de 10kHz/–20dB de la bande d'étalonnage STD-331B.	Vis de réglage d'azimut de tête. (Consulter la figure 10-2).	Bornes de sortie droite et gauche "OUTPUT".	Niveau maximal du signal de lecture.	
3	ARRÊT	Bloquer la vis de réglage à la peinture lorsque le réglage est terminé.				

2. Contrôle de l'égaliseur de lecture.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE	Lire le passage préenregistré de 315kHz/–20dB et de 6,3kHz/–20dB de la bande d'étalonnage STD-331B.	Contrôler	Bornes de sortie droite et gauche "OUTPUT".	Le niveau de lecture de 6,3kHz est de –0,5±2dB par rapport au niveau de 315Hz.	

3. Réglage du niveau de lecture.
- Ce réglage servant à étalonner le niveau DOLBY NR doit être exécuté avec un grand soin.

	Mode	Signal appliqué bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE	Lire le passage préenregistré de 315kHz/0dB de la bande d'étalonnage STD-331B.	V101 (canal gauche) V201 (canal droit)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	–17,9dBv (127,3mV)	

4. Réglage du détecteur de bande-amorce.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	LECTURE	Charger une demi-cassette sans bande.	V501 (unité de commande)	TP LEADER (unité de commande)	1,35V±0,05V	

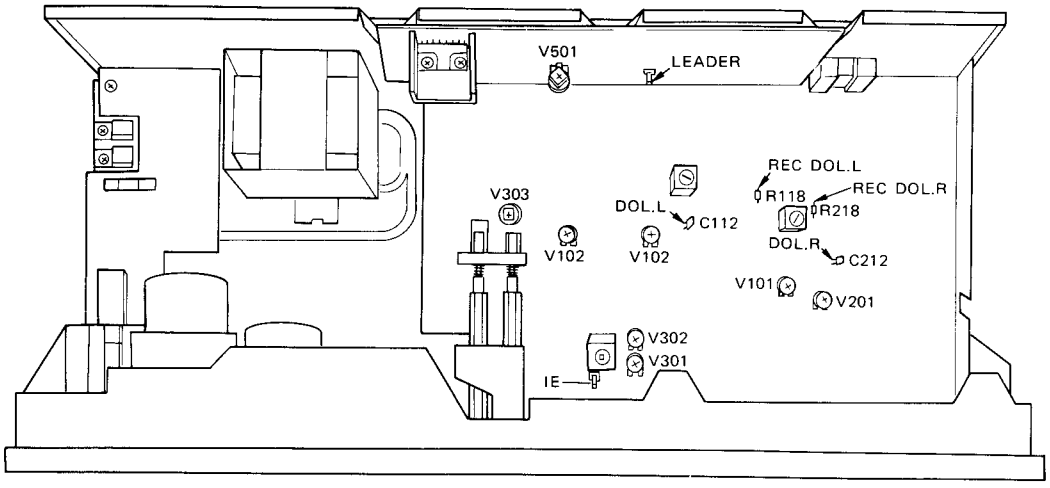


Fig. 10-4 Emplacements des dispositifs de réglage

5. Contrôle de fonctionnement des décibelmètres.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	PAUSE À L'ENREGISTREMENT	Injecteur un signal de 315Hz/ −10dBv (316mV) per les bornes d'entrée de ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL".	TP.DOL L (canal gauche) TP.DOL R (canal droit)	Vérifier si les décibelmètres "0dB" s'alument sous un niveau de sortie de signal de −17,9dBv±1,8dB.	

6. Réglage du courant d'effacement.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ENREGISTREMENT	Charger une bande STD-610 standard sans signal d'entrée.	V303	TP.IE	170mV±5mV AC	

7. Réglage de réponse en fréquence d'enregistrement et de lecture.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÈT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	PAUSE À L'ENREGISTREMENT	Injecter un signal de 315Hz/ −30dBv (31,6mV) per les bornes d'entrée de ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL".	TP.DOL L (canal gauche) TP.DOL R (canal droit)	−37,9dBv (12,7mV)	
3	ENREGISTREMENT/ LECTURE	Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-608A à 315Hz et 6,3kHz et lire ce passage.	V302 (canal gauche) V301 (canal droit)	Bornes de sortie droite et gauche "OUTPUT"	Le niveau de reproduction de 6,3kHz est de +1,0dB par rapport au niveau de 315Hz (lire les signaux enregistrés sur STD-608A).	
4		Changer la bande d'essai, le sélecteur de bande et les positions du commutateur de réduction de bruit DOLBY, et vérifier que la fréquence en réponse est satisfaisante (vor la fig. 10-5). Si la réponse en fréquence n'est pas dans la plage spécifiée, re-régler V302 et V301 de façon à ce que le niveau de reproduction de 6,3kHz se situe entre 0 et +1,5dB par rapport au niveau de 315Hz.				

8. Réglage du niveau d'enregistrement.

	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÈT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	PAUSE À L'ENREGISTREMENT	Injecter un signal de 315Hz/ −10dBv (316mV) par les bornes d'entrée ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL".	TP.DOL L (canal gauche) TP.DOL R (canal droit)	−17,9dBv (127,3mV)	
3		Régler le commutateur DOLBY NR en position ON.				
4	ENREGISTREMENT/ LECTURE	Enregistrer le niveau de signal indique plus haut sur la bande d'étalonnage STD-608A et lire ce passage.	V102 (canal gauche) V202 (canal droit)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	−17,9dBv (127,3mV)	
5		Placer le sélecteur de bande (TAPE SELECTOR) en posicion "CrO_2".				
6		Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-603 et lire ce passage.	Contrôler	TP.DOL L (canal gauche) TP.DOL R (canal droit)	−17,9dBv±1,5dB	
7		Placer le sélecteur de bande (TAPE SELECTOR) en position "METAL".				
8		Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-610 et lire ce passage.	Contrôler	TP.DOL L (canal gauche) TP.DOL R (canal droit)	−17,9dBv±1,5dB	

Brade d'étalonnage: STD-608A
Tape selector: NORM

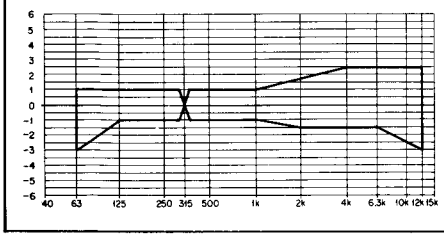
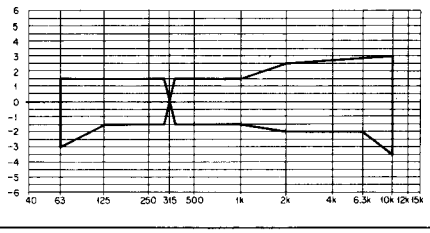
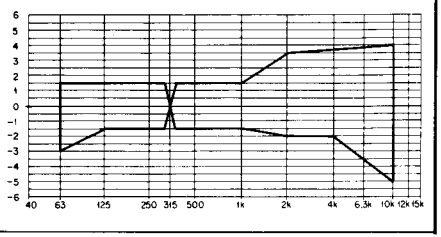
DOLBY NR: OFF (arrêt)	DOLBY NR: TYPE B ON (marche)	DOLBY NR: TYPE C ON (marche)
		

Fig. 10-5-1 Zone de réponse en fréquence admissible de lecture et d'enregistrement (NORM)

Barde d'étalonnage: STD-603
Tape selector: CrO_2

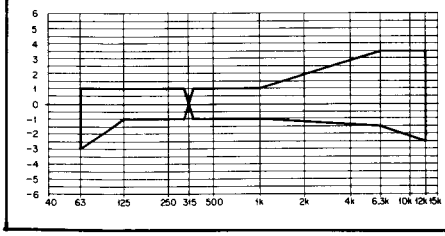
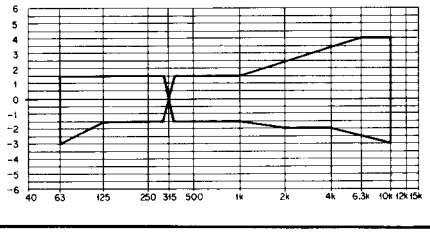
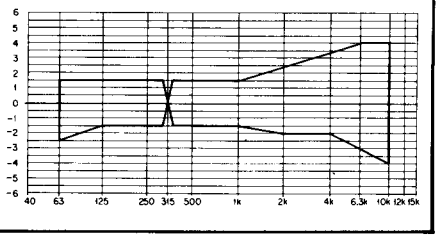
DOLBY NR: OFF (arrêt)	DOLBY NR: TYPE B ON (marche)	DOLBY NR: TYPE C ON (marche)
		

Fig. 10-5-2 Zone de réponse en fréquence adissible de lecture et d'enregistrement (CrO_2)

Barde d'étalonnage: STD-610
Tape selector: METAL

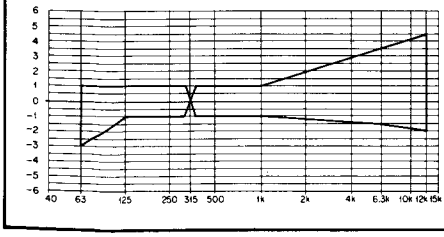
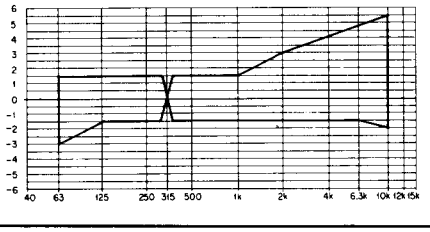
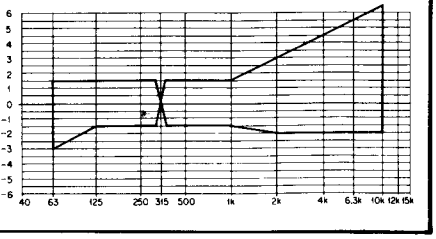
DOLBY NR: OFF (arrêt)	DOLBY NR: TYPE B ON (marche)	DOLBY NR: TYPE C ON (marche)
		

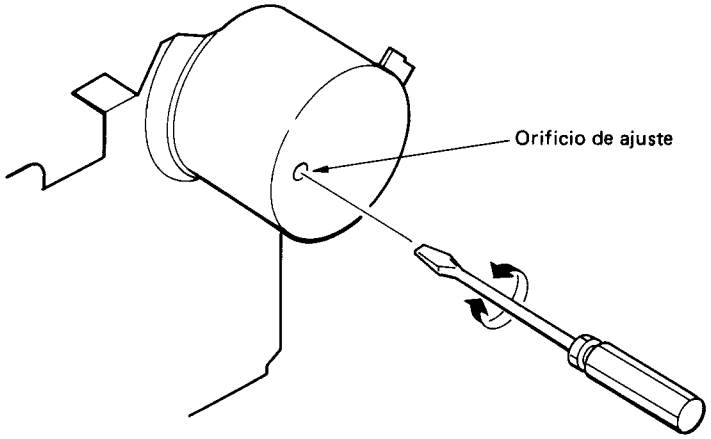
Fig. 10-5-3 Zone de réponse en fréquence adissible de lecture et d'enregistrement (METAL)

10. AJUSTE

10.1 AJUSTE MECANICO

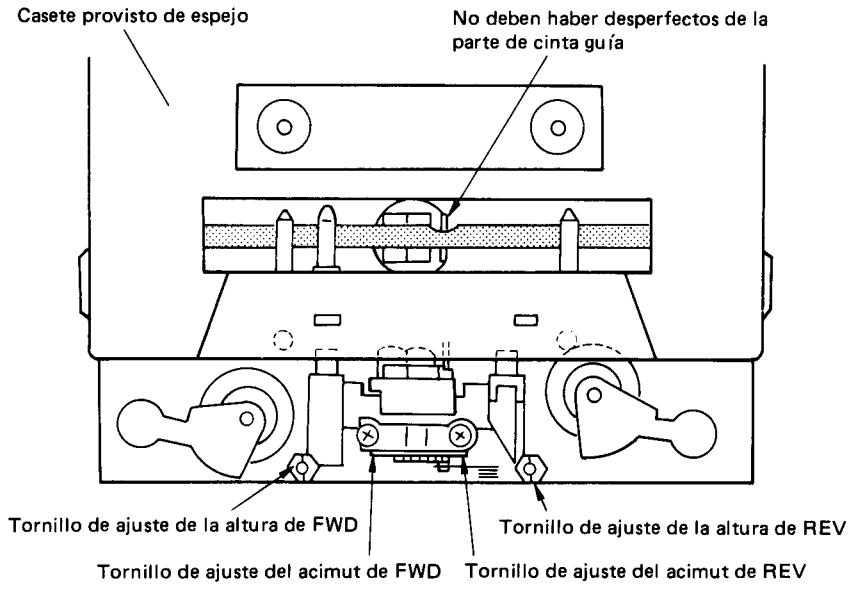
1. Ajuste de la velocidad de la cinta

Modo	Cinta de prueba	Posición de ajuste	Valor de especificación (frecuencia de reproducción)
PLAY	Reproducir la STD-301 (3kHz)	Control del resistor variable	3000Hz ± 5Hz



2. Ajuste del transporte de la cinta

Modo	Posición de ajuste	Especificaciones
FWD STOP	Tornillo de ajuste del acimut de FWD.	Con la puerta del marco abierta, las cabezas deben verse paralelas con la dirección de la cinta.
REV STOP	Tornillo de ajuste del acimut de REV.	
Cargar un casete con espejo y levantar la base de las cabezas con la mano de modo que la cinta toque la guía de cinta.		
STOP	Tornillos de ajuste de la alture (izquierdo y derecho)	Comprobar (visualmente) que la cinta esté situada en el centro de la guía de cinta.
FWD PLAY	Tornillo de ajuste de la altura de FWD.	Ajustar la primera guía de cinta para asegurar que no hay desperfectos de la cinta.
REV PLAY	Tornillo de ajuste de la altura de REV.	


Casete provisto de espejo
No deben haber desperfectos de la parte de cinta guía
Tornillo de ajuste de la altura de FWD
Tornillo de ajuste de la altura de REV
Tornillo de ajuste del acimut de FWD
Tornillo de ajuste del acimut de REV

10.2 AJUSTES ELECTRICOS

Condiciones de ajuste

1. Los ajustes mecánicos deben terminarse primero.
2. Limpiar y desimanar la cabeza de grabación.
3. Dejar que el magnetófono se precaliente por unos minutos antes de iniciar los ajustes eléctricos.
4. La señal de referencia es de 0dB=1Vrms.
5. Conectar una resistancia de carga de 50 kilo-ohmios (o entre 47 y 52 kilo-ohmios) a los terminales de salida (OUTPUT).
6. A menos que se especifique de otra manera, los siguientes interruptores deben estar en las posiciones indicadas:
   DOLBY NR : OFF
   SELECTOR DE CINTA : NORM

Cintas de prueba

STD-331B : Para ajustes de reproducción (Referirse a la Fig. 10-1)
STD-608A : Cinta NORMAL en blanco.
STD-603 : Cinta CrO_2 en blanco.
STD-610 : Cinta de METAL en blanco.

Lista de ajustes y comprobaciones

1. Ajuste azimutal de la cabeza de grabación
2. Comprobación del ecualizador de reproducción
3. Ajuste del nivel de reproducción
4. Ajuste del detector de cinta guía
5. Comprobación del indicador de nivel
6. Ajuste de la corriente de borrado
7. Ajuste de la respucsta de frecuencia de grabación y reproducción
8. Ajuste del nivel de grabación

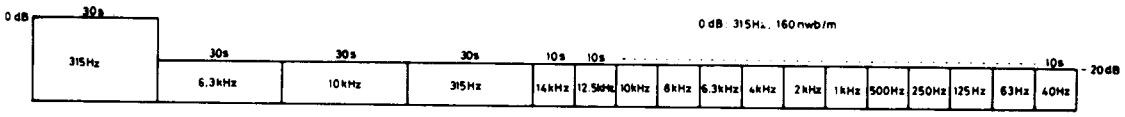


Fig. 10-1 Contenido de la cinta de prueba STD-331B

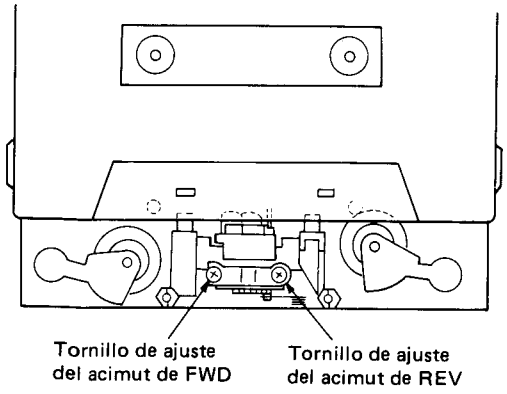


Fig. 10-2 Ajuste azimutal de la cabeza de grabación

Cinta de prueba	STD-331B
Selector de cinta	NORM
Interruptor DOLBY NR	OFF

• Debido al "efecto de borde", compensar -1dB el canal derecho a 63Hz.

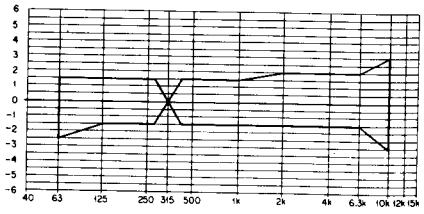


Fig. 10-3 Zona de respuesta de frecuencia de reproducción permisible

- **Poner el interruptor DOLBY NR en la position OFF.**

1. Ajusta azimutal de la cabeza de grabación.
- Girar V101 y V201 a la posición máxima (completamente a la derecha)

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY) (FWD, REV)	Reproducir la parte de 10kHz/–20dB de la cinta de prueba STD-331B.	Tornillo de ajuste azimutal de la cabeza de reproducción. (Referirse a la Fig. 10-2).	Terminales de salida (OUTPUT) derecho e izquierdo.	Nivel máximo de la señal de reproducción.	
3	Parada (STOP)	Dejar trabado el tornillo después de terminar el ajuste.				

2. Comprobación del ecualizador de reproducción.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY)	Reproducir las partes de 315Hz/–20dB y 6,3kHz/ –20dB de la cinta de prueba STD-331B.	Confirmación	Terminales de salida (OUTPUT) derecho e izquierdo.	El nivel de reproducción de 6,3kHz es de –0,5±2dB con relación al nivel de 315Hz.	

3. Ajuste del nivel de reproducción.
- Este ajuste determina el nivel DOLBY NR, y debe efectuarse con sumo cuidado.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY)	Reproduce la parte de 315 Hz/0dB de la cinta de prueba STD-331B.	V101 (canal izq.) V201 (canal der.)	TP.DOL L (canal izq.) TP.DOL R (canal der.)	–17,9dBv (127,3mV)	

4. Ajuste del detector de cinta guía.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Reproducción (PLAY)	Cargar un casete sin cinta.	V501 (unidad de control)	CINTA GUIA (unidad de control)	1,35V±0,05V (DC)	

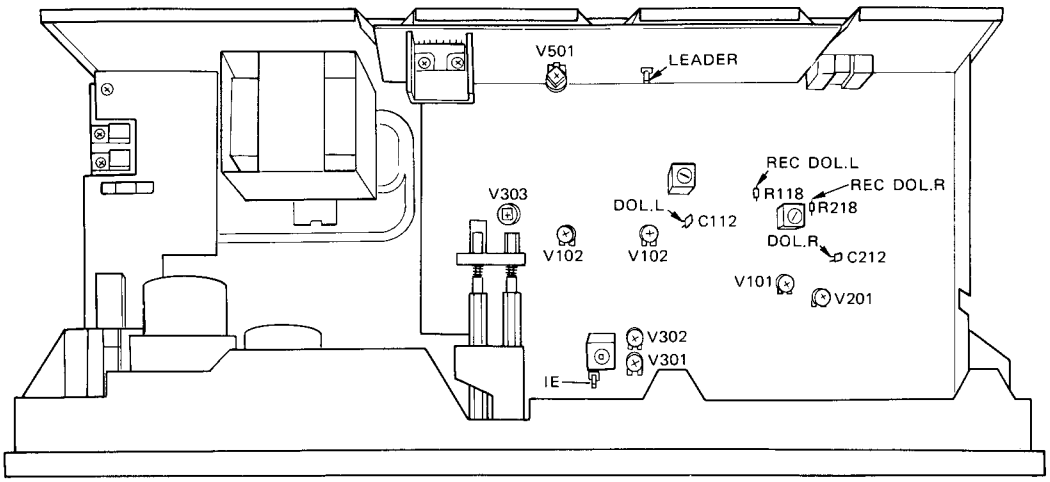


Fig. 10-4 Puntos de ajuste

5. Comprobación del indicador de nivel.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Grabación/ pausa (REC/ PAUSE)	Aplicar una señal de 315Hz −10dBv (316mV) a los terminales de entrada de línea (LINE INPUT).	Control de nivel de grabación. (REC LEVEL)	TP.DOL L (canal izq.) TP.DOL R (canal der.)	Comprobar que los indicadores de nivel "0dB" se encienden dentro de −17,9dBv±1,8dB del nivel de señal de salida.	

6. Ajuste de la corriente de borrado.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Grabación (REC)	Cargar la cinta STD-60 estándar sin señal de entrada.	V303	TP.IE	170mV±5mV CA	

7. Ajuste de la respuesta de frecuencia de grabación y reproducción.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Grabación/ pause (REC/ PAUSE)	Aplicar una señal de 315Hz/ −30dBv (31,6mV) a los terminales de entrada de línes (LINE INPUT).	Control de nivel de grabación (REC LEVEL)	TP.DOL L (canal izq.) TP.DOL R (canal der.)	−37,9dBv (12,7mV)	
3	Grabación/ reproducción (REC/ PLAY)	Grabar el nivel de señal en la cinta de prueba STD-608A a 315Hz y 6,3kHz, y reproducir.	V302 (canal izq.) V301 (canal der.)	Terminales de salida (OUTPUT) derecho e izquierdo.	El nivel de reproducción de 6,3kHz es de +1,0dB en comparación con el nivel de 315Hz. (Reproducir las señales grabadas en el STD-608A.)	
4		Cambiar la cinta de prueba, y las posiciones del interruptor selector de cinta y el interruptor DOLBY NR, y comprobar si la respuesta en frecuencia es satisfactoria. (Referirse a la Fig. 10-5.) Si la respuesta no está dentro de la gama especificada, reajustar V302 y V301 hasta que el nivel sea 0~+1,5dB en comparación con el nivel de 315Hz del paso 3.				

8. Ajuste del nivel de grabación.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Grabación/ pause (REC/ PAUSE)	Aplicar una señal de 315Hz/ −10dBv (316mV) a los terminales de entrada de línea (LINE INPUT).	Control de nivel de grabación (REC LEVEL).	TP.DOL L (canal izq.) TP.DOL R (canal der.)	−17,9dBv (127,2mV)	
3		Regular el interruptor DOLBY NR a la posición ON.				
4	Grabación/ reproducción (REC/ PLAY)	Grabar el nivel de señal en la cinta de prueba STD-608A, y reproducir.	V102 (canal ezq.) V202 (canal der.)	TP.DOL L (canal ezq.) TP.DOL R (canal der.)	−17,9dBv (127,3mV)	
5		Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición CrO_2.				
6		Grabar la señal en la cinta de prueba STD-603, y reproducir.	Confirmación	TP.DOL L (canal izq.) TP.DOL R (canal der.)	−17,9dBv±1,5dB	
7		Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición METAL.				
8		Grabar la señal en la cinta de prueba STD-610, y reproducir.	Confirmación	TP.DOL L (canal izq.) TP.DOL R (canal der.)	−17,9dBv±1,5dB	

Cinta de prueba: STD-608A
Selector de cinta: NORM

DOLBY NR: OFF	DOLBY NR: TIPO B ON	DOLBY NR: TIPO C ON

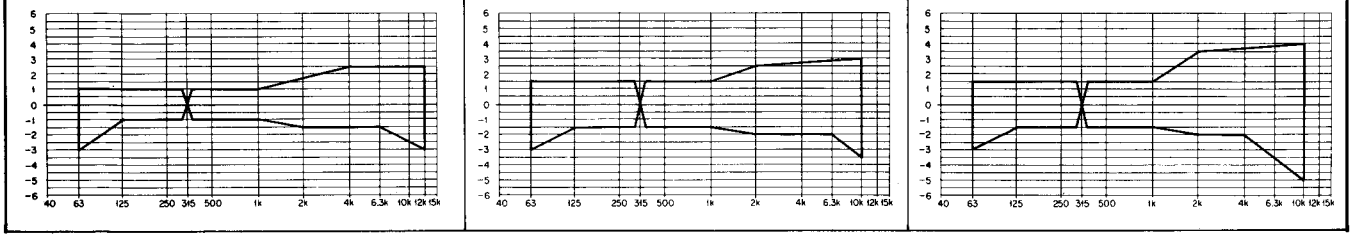


Fig. 10-8-1 Zona de respuesta de frecuencia de grabación y reproducción permisible (NORM)

Cinta de prueba: STD-603
Selector de cinta: CrO_2

DOLBY NR: OFF	DOLBY NR: TIPO B ON	DOLBY NR: TIPO C ON

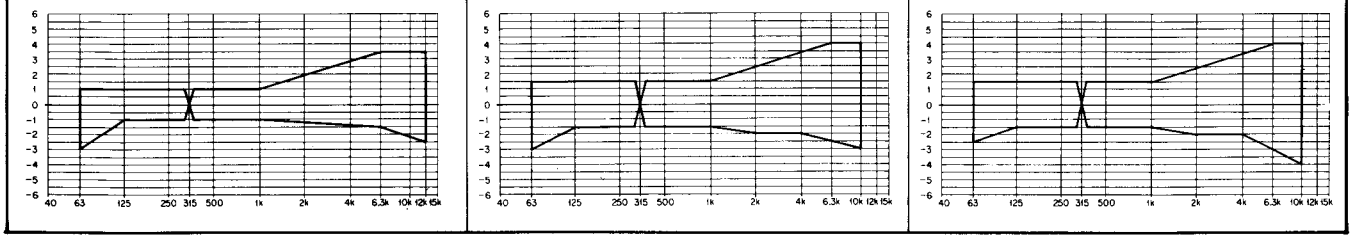


Fig. 10-8-2 Zona de respuesta de frecuencia de grabación y reproducción permisible (CrO_2)

Cinta de prueba: STD-610
Selector de cinta: METAL

DOLBY NR: OFF	DOLBY NR: TIPO B ON	DOLBY NR: TIPO C ON

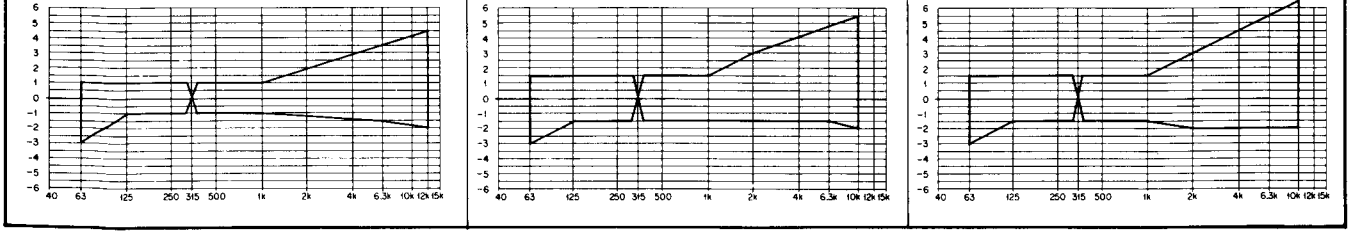


Fig. 10-8-3 Zona de respuesta de frecuencia de grabación y reproduccion permisible (METAL)

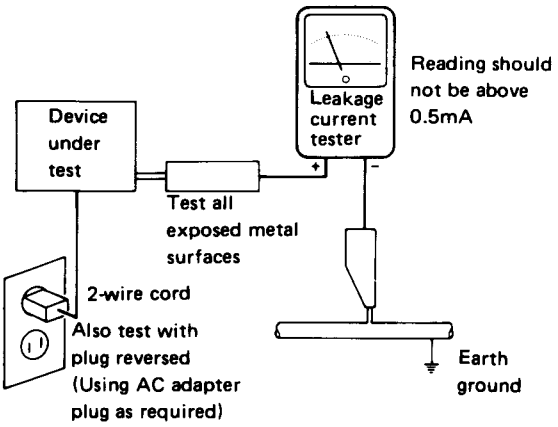
11. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Device under test
Leakage current tester
Reading should not be above 0.5mA
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

12. SUPPLEMENT FOR CT-1160R HEM, HB AND D TYPES

CT-1160R/HEM, HB and D types are the same as the KU type with the exception of following sections:

Mark	Symbol & Description	Part No.			
		KU type	HEM type	HB type	D type
⚠ ★	T1 Power transformer (120V)	RTT-425	.....	.....	.....
	(220V/240V)	.....	RTT-427	RTT-427	.....
	(120V/220V/240V)	.....	.....	.....	RTT-428
⚠ ★★	FU1 Fuse (1.25A)	REK-073	.....	.....	REK-073
	(T1.25A)	.....	REK-070	REK-101	.....
⚠ ★★	S1301 Line voltage selector	.....	.....	.....	RSX-057
⚠	AC power cord	RDG-048	RDG-053	RDG-052	RDG-058
⚠	Strain relief	REC-395	REC-396	REC-396	REC-395
	Power supply unit	non supply	non supply	non supply	non supply
	Transistor A unit	Non supply	Non supply	Non supply	Non supply
	Transistor B unit	Non supply	Non supply	Non supply	Non supply
	Packing case (CT-1160R [BK])	RHG-823	RHG-832	RHG-832	RHG-832
	Packing case (CT-1160R)	RHG-824	RHG-833	RHG-833	RHG-833
	Operating instructions (English)	RRB-261	.....	RRB-261	RRB-261
	(English/German/French/Italian)	.....	RRE-084	.....	.....
	(Spanish – auxiliary)	.....	.....	.....	RRD-078

Power Supply Unit, Transistor A Unit and Transistor B Unit for HEM and HB Types

HEM and HB types are the same as the KU type with the exception of the following sections:

- **Power Supply Unit**

Symbol & Description	for KU	for HEM, HB
⚠ ★ D404, D405	RD13EB2 (MTZ13B)	RD15EB1 (MTZ15A)

- **Transistor A Unit**

Symbol & Description	for KU	for HEM, HB
⚠ ★★ Q1001	2SD1265	2SD1276

- **Transistor B Unit**

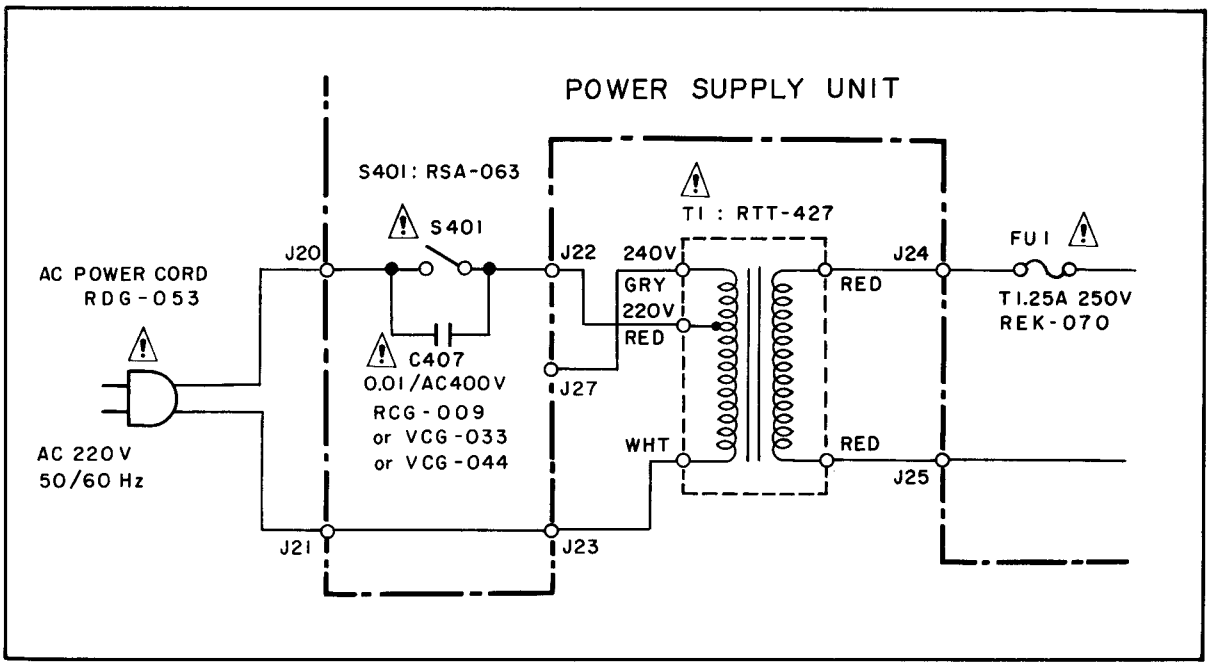
Symbol & Description	for KU	for HEM, HB
⚠ ★★ Q1101	2SD1265	2SD1276

Line Voltage Selection for HEM and HB Types

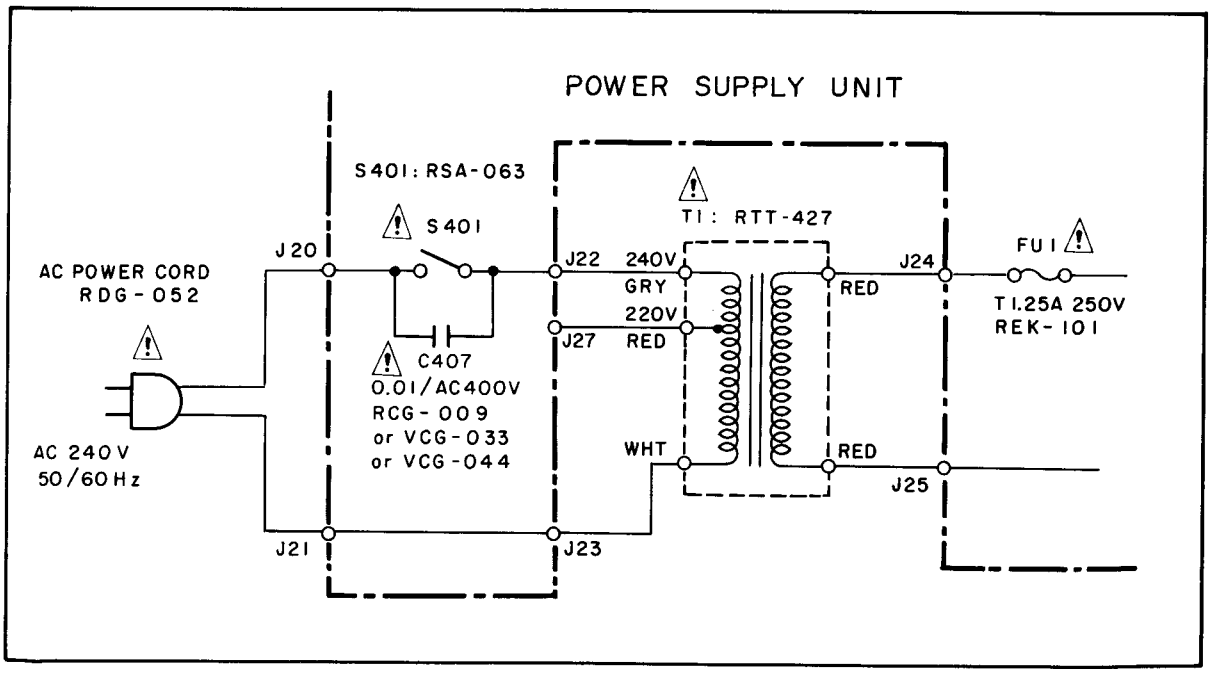
1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection of the power transformer primary lead wires as follows:
   - 220V: Connect the gray lead wire to the J27 terminal on the power supply unit, and connect the red lead wire to the J22 terminal.
   - 240V: Connect the gray lead wire to the J22 terminal on the power supply unit, and connect the red lead wire to the J27 terminal.
4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

Power Supply Circuit for HEM Type



Power Supply Circuit for HB Type



Power Supply Circuit for D Type